[1649/97A]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Walczak et al.	Group Art Unit: 2854
Serial No.:	10/087,568	Examiner: Funk, S.
Filing Date:	March 1, 2002	Confirmation No.: 5127
For:	LITHOGRAPHIC NEWSPAPER PRINTING PRESS	

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Commissioner for Patents
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Date: January 26, 2005

Signature: _____
Abraham P. Ronai, Reg. No. 41, 275

DECLARATION UNDER 37 C.F.R. § 1.132

I, Harvey Robert Levenson, Ph.D., declare:

1. This declaration is submitted in response to the rejection of claims 1 to 14 of Patent Application Serial No.10/087,568 ("the '568 Application") as detailed in the Final Office Action of January 21, 2004 and the Advisory Action of August 17, 2004. Specifically, claims 1 to 14 were rejected on the following grounds:

a. Claims 1, 2, 5, 6 and 11 were rejected as unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 3,992,992 ("Smith," included in Exhibit A) in combination with U.S. Patent No. 3,335,663 ("Harenza," included in Exhibit B) and U.S. Patent No. 5,241,905 ("Guaraldi et al.," included in Exhibit C);

b. Claims 3 and 4 were rejected as unpatentable under 35 U.S.C. §103(a) over Smith in combination with Harenza, Guaraldi et al. and EP 644,048 ("Schneider et al.");

c. Claim 7 was rejected as unpatentable under 35 U.S.C. §103(a) over Smith in combination with Harenza, Guaraldi et al. and U.S. Patent No. 5,152,222 ("Okamura et al.");

d. Claims 8 to 10, 13 and 14 were rejected as unpatentable under 35 U.S.C. §103(a) over Smith in combination with Harenza, Guaraldi et al., Okamura et al. and U.S. Patent No. 5,617,788 ("Horiguchi et al."); and

e. Claim 12 was rejected as unpatentable under 35 U.S.C. §103(a) over Smith in combination with Harenza, Guaraldi et al. and "applicant's admission of prior art."

2. In my opinion, neither Smith, Harenza nor Guaraldi et al. alone or in combination disclose, or even suggest, a plate cylinder having a circumference substantially equal to the height of a printing plate sized to carry a single newspaper page, as recited in claim 1. It is further my opinion that even if Smith and Harenza did disclose such a one page around arrangement (which they do not), it would not have been obvious to one of ordinary skill in the art to take a plate cylinder and its plate arrangement used in a 2:1 printing press, such as Smith and Harenza, as suggested by the Final Office Action, and use it in a 1:1 printing press, such as Guaraldi et al. It is further my opinion that it would not have been obvious to one of ordinary skill in the art at the time of filing of the '568 Application to have reduced the height of a printing plate from two newspaper pages high to one newspaper page high. It is further my opinion that Harenza does not disclose that each of the plate cylinders has a circumferential register adjustment system configured to provide circumferential register adjustment to its respective plate cylinder, as recited in claim 4.

I. Qualifications

3. I am presently a Professor at California Polytechnic State University (Cal Poly) in San Luis Obispo, Calif. and Department Head of its Graphic Communication Department. I have been involved in the printing industry for approximately 42 years during which I studied printing and held positions with professional organizations in advertising, commercial printing, research and education. I have four degrees, three of which focus on printing technology and management and one on communication. I hold a Ph.D. in Rhetoric and Communication from the University of Pittsburgh, a Master of Science degree in Printing from South Dakota State University, a Bachelor of Science degree in Printing from the Rochester Institute of Technology and an Associates of Applied Science degree in Graphic Arts and Advertising Technology from

New York City Community College (now known as New York City College of Technology). My educational and professional background is detailed further in my *curriculum vitae*, attached hereto as Exhibit D.

II. The difference between a one "plate" around arrangement and a one "page" around arrangement.

4. A person of ordinary skill in the art pertaining to the '568 Application typically would have had a Bachelor of Science degree in technical disciplines, such as mechanical or chemical engineering, industrial technology, printing or related disciplines and related job experience of approximately 5 years.

5. By way of background, offset lithographic printing presses produce images from a planographic image carrier, known as a printing plate, which transfers an image to an offset lithographic blanket. The blanket then transfers the image to a substrate, typically paper.

6. In August 1967 (the issue date of Harenza) and November 1976 (the issue date of Smith) offset lithographic conventional printing plates were in the form of flat, thin, rectangular sheets having opposite ends. In use, the plates were wrapped around the surface of a plate cylinder of a printing unit of a printing press. Typically the opposite ends of the printing plate were clamped in a clamping gap running axially along the surface of the cylinder. At the time of Harenza and Smith printing plates had at least two pages mounted one above the other in the rolling direction, i.e., the plate had a height of at least two pages. Correspondingly, the plate cylinder upon which the plate was mounted had a circumference corresponding to at least the height of the two pages mounted on the plate.

7. Smith relates to a dampener for a printing press. Smith states that the printing press includes a plate cylinder 10 adapted to carry four axially adjacent lithographic printing plates mounted about the peripheral surface thereof. See col. 2, lines 11 to 17. Smith does not disclose, or even suggest, however, plate cylinders having a circumference substantially equal to the height of a printing plate sized to carry a single newspaper page, as recited in claim 1. Smith may disclose a one "plate" around arrangement but not a one "page" around arrangement. There is a distinction between a “plate” and a “page.” A one-around cylinder may have more than one page mounted around its circumference depending on the height of the mounted plate. Smith states in the sentence bridging columns one and two that its printing press is "double width." It

is my opinion that the language "double width" refers to the length along the longitudinal axis of the printing cylinder not the height of the printing plate. Further, it is my opinion that Smith included at least two pages around the circumference of its plate cylinder given that at the time of Smith press impositions, i.e., layouts of images or pages on the plate, for newspapers included at least two pages around the circumference of the plate cylinder. See, for example, the standard impositions diagrammed in the following three printing press publications, which date around the time of Smith, none of which include an imposition having less than two pages in height.

- "The Warren Paper Estimating Guide," S.D. Warren Company, Boston, Mass., 1972, pages 9 to 27 (odd numbered pages, included in Exhibit E).
- Kelly, Course and Supansic, "Web Offset Press Operating," Graphic Arts Technical Foundation, Pittsburgh, Penna., 1974, p. 70 (included in Exhibit F).
- Blair and Shapiro, "The Lithographers Manual," Graphic Arts Technical Foundation, Pittsburgh, Penna., 1980, pages 9:28-29 (included in Exhibit G).

Note that all of the impositions diagrammed in the above printing press publications, aside from those used for posters and wall charts, which are not printed on newspaper presses, are at least two pages high.

8. It is further my opinion that the Final Office Action reference to col. 3, lines 50 to 51 of Smith in no way discloses, or even suggests, a "page size printing plate." Smith states as follows:

> As illustrated in FIG. 1, a series of four baffles 34, 35, 36 and 37 are employed each of which is substantially equivalent in width to the width of a page size printing plate and thus each baffle serves to meter the volume of dampening fluid to its respective plate.

Exh. A, col. 3, lines 48 to 52. One skilled in the art would recognize that Smith's use of the descriptor "page size" above in reference to the printing plate refers only to the width of the plate not the height. Clearly, in the above context, a plate having a multiple page height, for example, would still qualify as a "page size" given that it would still be equivalent in width with each baffle. Reference to the plate as a "page sized printing plate" in the above excerpt, therefore, in no way indicates the height of the plate. As indicated above, one skilled in the art would recognize that at the time of Smith, as well as at the time of filing of the present application, web offset printing press impositions for newspapers included at least two pages around the circumference of the plate cylinder.

9. Harenza purportedly relates to a printing press including a means for securing and registering thin printing plates on a cylinder driven in either direction. See col. 1, lines 9 to 12. The cylinder is stated to have a plate mounted "one around" and either two or four plates across extending the length of the cylinder. See Exh. B, col. 2, lines 34 to 38. Nowhere does Harenza disclose, or even suggest, plate cylinders having a circumference substantially equal to the height of a printing plate sized to carry a single newspaper page, as recited in claim 1. As indicated above, a one-around cylinder mounted plate may have more than one page mounted around its circumference depending on its height. It is my opinion that Harenza included at least two pages around the circumference of its plate cylinder given that at the time of Harenza, as detailed above, press impositions for newspapers included at least two pages around the circumference of the plate cylinder.

10. Guaraldi et al. purportedly relate to a printing unit. Guaraldi et al. state that the printing unit includes upper and lower plate cylinders 14 and 18 and that a single printing plate is wrapped around each plate cylinder by locking mechanisms. See Exh. C, col. 2, lines 49 to 53. Guaraldi et al. do not disclose, or even suggest, plate cylinders having a circumference substantially equal to the height of a printing plate sized to carry a single newspaper page, as recited in claim 1. In fact, Guaraldi et al. make no mention of printing plate imposition. Regardless, one of ordinary skill in the art would recognize that at the time of Guaraldi et al. (September 1993), as well as at the time of filing of the present application, as detailed above, web offset printing press impositions for newspapers included at least two pages around the circumference of the plate cylinder Therefore, it is my opinion that Guaraldi et al. included at least two pages around the circumference of its plate cylinder.

11. In view of the foregoing and based on my 42 years of experience in the printing industry, it is my opinion that none of the references cited, taken individually or in combination, disclose, or even suggest, plate cylinders having a circumference substantially equal to the height of a printing plate sized to carry a single newspaper page, as recited in claim 1.

III. It would not have been obvious to take a plate cylinder and its plate arrangement used in a 2:1 printing press, such as Smith and Harenza, as suggested by the Final Office Action, and use it in a 1:1 printing press, such as Guaraldi et al.

12. It is my opinion that the Smith printing press is a 2:1 printing press for the following reasons. Smith states that the printing press includes a plate cylinder 10 adapted to carry four axially adjacent lithographic printing plates mounted about the peripheral surface thereof. See Exh. A, col. 2, lines 11 to 17. Smith does not disclose a blanket cylinder, let alone the relative size of the plate and blanket cylinders. Given the time frame of Smith, however, it is known to one of ordinary skill in the art that blanket cylinders were clamped at their ends in relatively large grooves in the blanket cylinder, which generally required a 2:1 blanket cylinder to plate cylinders diameter ratio to dampen vibrations. See, for example, the following well known references in the printing industry.

- Kelly, Crouse and Supansic, "Web Offset Press Operating," Graphic Arts Technical Foundation, Pittsburgh, Penna., 1974, pp. 12-15 and 22. (See Exhibit H.).
- Hird, "Offset Lithographic Technology," The Goodheart-Willcox Co., South Holland, Illinois, 1995, Figure 27-8 and p. 610 (See Exhibit I.).
- Blair and Shapiro, "The Lithographers Manual," Graphic Arts Technical Foundation, Pittsburgh, Penna., 1980, p. 12:19 (See Exhibit J.).

In regard to the Kelly, Course and Supansic reference, see pages 12 to 15, which deal with plate cylinder gaps, and page 22, which shows a 2:1 configuration. In regard to the Hird reference, see figure 27-8 on page 610, which shows a 2:1 configuration. In regard to the Blair and Shapiro reference, see p. 12:19, which shows a blanket cylinder gap and clamping mechanism. Collectively these references show that printing press blanket and plate cylinders had gaps, which would meet as the cylinders rotated at high speed and contribute to cylinder bounce or press vibration. Such bounce or vibration became enhanced as the press speed was increased. Hence, the presses had to be run at slower speeds than their capabilities. The references also depict what was in the past a typical press printing unit configuration known as 2:1, wherein the plate cylinder was half the diameter of the blanket cylinder. This produced two images on the blanket of the two-around pages on the plate with each blanket rotation. One skilled in the art would recognize that the 2:1 ratio was necessary to decrease cylinder bounce or press vibration caused by the gaps. In a 2:1 configuration there are fewer rotations per unit of time, which

decreased the vibrations produced compared to that of a 1:1 configuration, which has a higher frequency of plate and blanket cylinder gap contact as the cylinders rotated. Given the above, one of ordinary skill in the art would recognize that Smith deals with 2:1 printing presses.

13. It is my opinion that the Harenza printing press is a 2:1 printing press for the following reasons. Harenza does not disclose a blanket cylinder or the relative size of the blanket cylinder to the plate cylinder. However, consistent with my opinion regarding Smith above, it is apparent to one of ordinary skill in the art that given the large vibration causing gap, required by the use of the two lock-up mechanism (see Exh. B, Figure 8), the blanket cylinders used with the plate cylinders generally would have a 2:1 diameter ratio; the larger blanket cylinders being used to dampen vibrations caused by the large gap in the plate cylinder. Given the above, one of ordinary skill in the art would recognize that Harenza deals with 2:1 printing presses.

14. It is further my opinion that it would not have been obvious to take a plate cylinder and its plate arrangement used in a 2:1 printing press, such as Smith and Harenza, as suggested by the Final Office Action, and use it in a 1:1 printing press, such as Guaraldi et al. The relative size of the plate and blanket cylinders has a dramatic effect on the vibrations produced, and thus, on the overall functioning of the printing press. Accordingly, the plate and blanket cylinders are necessarily designed as pairs. Given this design reality, it would not have been obvious to mix and match pair elements, i.e., take the plate cylinder and plate arrangement alone from the 2:1 printing press of Smith or Harenza and use it to replace the plate cylinder and plate arrangement from the 1:1 printing press of Guaraldi et al. This is especially so given, as indicated above, that the plate cylinder of Guaraldi et al. is stated to roll against a continuous, i.e., no gap, blanket cylinder and given that the plate cylinders of Smith and Harenza roll against a blanket cylinder having a gap.

15. Further, it is my opinion that U.S. Patent No. 4,913,048 ("Tittgemeyer," included in Exhibit K), which relates to a method and apparatus for printing with a lithographic sleeve, does not provide any motivation, or suggestion, to take a plate cylinder and its plate arrangement used in a 2:1 printing press, such as Smith and Harenza, and use it in a 1:1 printing press, such as Guaraldi et al., as suggested by the Advisory Action. Nor does Tittgemeyer provide any motivation, or suggestion, for reducing the plate cylinder from two or more pages around to one page around.

IV. It is further my opinion that Harenza does not disclose all of the limitations of claim 4.

16. It is my opinion that Harenza does not disclose that each of the plate cylinders has a circumferential register adjustment system configured to provide circumferential register adjustment to its respective plate cylinder, as recited in claim 4. See Exh. B, col. 1, lines 55 to 59 of Harenza, which specifically refers to adjustment of the printing plates not the plate cylinder.

V. It is further my opinion that it would not have been obvious at the time of filing of the '568 Application to have reduced the height of a printing plate from two newspaper pages high to one newspaper page high.

17. It is further my opinion that it would not have been obvious at the time of filing of the '568 Application to have reduced the height of a printing plate from two newspaper pages high to one newspaper page high for the following reasons.

18. Firstly, reducing the plate cylinder from two around to one around reduces the number of pages that can be printed per unit time without a corresponding increase in rotational speed of the plate cylinders.

19. Second, one skilled in the art at the time of filing the '568 Application would have expected a decrease in plate cylinder diameter to increase vibrations, which is an undesirable side effect. The increased vibrations would have been expected due to the resulting decrease in plate cylinder stiffness and the increase in revolutions per given period of time.

VI. Conclusion

20. In summary, it is my opinion that neither Smith, Harenza nor Guaraldi et al., individually or in combination, disclose, or even suggest, a plate cylinder having a circumference substantially equal to the height of a printing plate sized to hold a single newspaper page, as recited in claim 1. It is further my opinion that even if Smith and Harenza did disclose a one page around arrangement (which they do not), it would not have been obvious to one of ordinary skill in the art to take a plate cylinder and its plate arrangement used in a 2:1 printing press, such as Smith and Harenza and use it in a 1:1 printing press, such as Guaraldi et al. It is further my opinion that it would not have been obvious to one of ordinary skill in the art at the time of filing

of the '568 Application to have reduced the height of a printing plate from two newspaper pages high to one newspaper page high. It is further my opinion that Harenza does not disclose that each of the plate cylinders has a circumferential register adjustment system configured to provide circumferential register adjustment to its respective plate cylinder, as recited in claim 4.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: January 25, 2005

Harvey Robert Levenson, Ph.D.

Curriculum Vitae

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EDUCATION

Ph. D., Rhetoric and Communication, Department of Speech and Theatre Arts, University of Pittsburgh, Pittsburgh, Pennsylvania

M. S., Printing Management and Journalism, Department of Journalism and Mass Communication, South Dakota State University, Brookings, South Dakota.

B. S., Printing, School of Graphic Arts and Photography, Rochester Institute of Technology, Rochester, New York.

A. A. S., Graphic Arts and Advertising Technology, New York City Community College (now New York City College of Technology), Brooklyn, New York.

PROFESSIONAL

Department Head and Professor
Graphic Communication Department
California Polytechnic State University
San Luis Obispo, Calif. 93407
August, 1983 - present

Chair and Associate Professor
Division of Graphics, Design, and Communication
La Roche College
9000 Babcock Boulevard
Pittsburgh, Penna. 15237
January, 1976 - June, 1983

Associate Director
Technical Services Department
Graphic Arts Technical Foundation
4615 Forbes Avenue

Pittsburgh, Penna. 15213
August, 1968 - December, 1975

Various positions in graphic communication and advertising media planning and preparation, in New York City.
1961 - 1965

ACHIEVEMENTS AND PHILOSOPHY

California Polytechnic State University: August 1983 - Present

My perspective on heading a department (www.grc.calpoly.edu) with nearly 60 years of successful education and professional placement of its students is to pursue change thoughtfully. I maintain the perspective that changes made in curriculum, laboratories, and staffing should not jeopardize the foundation and role of a program that has risen to national prominence, but should add to the program's ability to build on its reputation in the years ahead.

Philosophy: I believe that a university is a place for individuals to experience ideal conditions. It should be the mission of a university to pursue ideal conditions in programs, research, and laboratories. I realize, however, that there are frequently constraints that make the pursuit of ideals a dynamic process requiring on-going change. Thus, change and the experiments, trials, successes and failures that go with it, must be the rule, not the exception, and require the support of administration, faculty, and staff participating in the pursuit of ideals.

My **accomplishments** at Cal Poly fall into six categories:

(1) Budget Management and Planning
(2) Faculty Development
(3) Industry and Professional Relations
(4) Development and Laboratory Improvements
(5) Student Relationships
(6) Teaching Effectiveness
(7) Research and Development

Budget Management and Planning: I plan and monitor the department's budget on a regular basis. This involves a reporting system that displays initial, or adjusted, budget allocations, and present "bottom-line" expenditures for all budget categories. I have instituted a system whereby a discretionary portion of the budget is allocated to each faculty member for professional development. Hence, each faculty member has her or his own account that is added to as discretionary funds are raised. This gives the faculty personal responsibility in managing their own budget and planning their professional development.

Faculty Development: I encourage and support faculty participation in national and international conferences, seminars and workshops, and I encourage faculty proposals for assigned time and sabbaticals. I also encourage faculty research and presentations at seminars, workshops and conferences. Department faculty members are often found traveling around the country and even the world pursuing development opportunities to make them better professors. Many of these opportunities have resulted from grants provided by private corporations and professional associations.

Industry and Professional Relations: I have extended my department's reach to all major national associations and foundations in the graphic communication profession.

This has resulted in joint programs with such groups in the form of seminars, workshops, conferences, research, testing and other activities associated with development needs of the profession. My outreach has extended to the area of literacy. As founder of the Graphic Arts Literacy Alliance and former chair of the board, I am involved in programs to reduce illiteracy and apathy towards print media in the nation.

Development and Laboratory Improvements: I have completed and supported faculty negotiations with equipment and supply manufacturers for contributions of millions of dollars of state-of-the-art technology for the department's laboratories. Under the Graphic Communication "Partners in Education" program, the department has a growing endowment which is among the largest of any individual department at Cal Poly. The endowment has grown to a point of ensuring the continued growth and development of the department's faculty, staff, curriculum, and laboratories. I have spearheaded and supported faculty industry-relations efforts resulting in over $10 million in gifts and grants alone. In 1996, my department's development efforts made the College of Liberal Arts the university's development leader for that year. And since then the college has retained its leadership role in development due primarily to the efforts of the Graphic Communication department. All of the contributions were to support program improvement and teaching effectiveness of the faculty.

Student Relationships: I encourage scholarship and intellectual pursuit among the students. I do this by establishing and maintaining rigorous, but achievable, standards of performance. I have encouraged valid research and clear, intelligent presentations in classes. I also advise a student research and scholarship group (TAGA student chapter) having the purpose of discussing science and research in the students' field of study. This group also publishes an annual journal of student work that is presented annually at an international competition.

Another student program I initiated is called "Graduate School Day." This program encourages students to consider graduate school upon receiving their Bachelor's degree or after a few years of work experience. The program involves a visit by a representative from a university having a graduate program in graphic arts or related disciplines. To date, visits were made by Rochester Institute of Technology, New York University, Arizona State University, and Clemson University.

Teaching Effectiveness: I annually modify my courses to reflect improved pedagogical approaches and updated content and I encourage all faculty members to do the same. In my Research Methods Class I have introduced components on computerized literature and abstract searches using the Internet, I have added components on campus statistical resources, and on improved writing skills. In these three areas I use the services of the university's Kennedy Library Reference Department, the Statistics Department Statistical Consulting Service, and the Cal Poly Writing Lab. In my Introduction to Graphic Communication class, I have updated textbooks in the past five years, and in my New Technologies in Graphic Communication Class, I regularly add content to reflect the rapidly changing technologies and issues in the graphic communication profession. Along with my regular classes, I supervise Senior Projects and Special Problems. I have supervised Cooperative Education students, and also taught Applied Graphic

Communication Practices. My teaching effectiveness is reflected by my above-average student evaluations of my classes. I achieve this in spite of my attending to department head duties and increasing my class sizes to enhance student throughput. For example, I have opened my Introduction to Graphic Communication class to as many as 135 students. I have also introduced my classes to interactive Internet lectures, called "cyberlectures," at times when I am on university travel commitments.

A general goal that I have established is to enhance the validity of graphic communication as an academic discipline and profession. This is achievable through continued excellence in teaching, research, faculty presentations at seminars and conferences, increased participation in professional consulting and through participation on department, college, and university committees. I actively support each of these activities and also participate in them.

For the work I have done to improve academic conditions and standards at Cal Poly and to establish a standard for graphic communication education nationally, I received the Graphic Arts Technical Foundation "Award of Excellence." This is an annual award given to the individual who has made the most significant contribution to education in the field. I received a Cal Poly award for Meritorious Performance and Professional Promise. This award was given for distinguished service to the university and for dedication to the university's mission. I received the U. S. Government's highest civilian award, the "Distinguished Service Award" for chairing the Academic Advisory Council of the Public Printer of the United States and for involving the U. S. Government Printing Office in issues related to literacy. I was honored by an invitation to The White House by the President of the United States and the First Lady for my work to mobilize the North American printing and publishing industry to support "grass root" literacy initiatives. The Technical Association of the Graphic Arts student research paper award was named after me. I received a Cal Poly Performance Salary Step Increase award given for meritorious teaching and a record of service and professional accomplishments, and have received other faculty meritorious performance awards.

Research and Development: I spearheaded the development of a major department research and development initiative called, "The Graphic Communication Institute at Cal Poly" (see www.grc.calpoly.edu/institute). After about five years in planning, the Institute resulted in an entity providing research, testing, product evaluation, seminar, workshop, and conference services for the graphic communication profession.

La Roche College: January, 1976 - June, 1983

La Roche College is a "four-year" college offering the baccalaureate and masters degree in liberal arts and professional areas.

I was hired by La Roche College to establish programs that would result in viable and meaningful career opportunities for its graduates. My major contribution to La Roche was the development of three such programs: one in Graphic Arts, one in Graphic Design, and the third in Communication. The success of these programs is evident by

graduates of the Graphics, Design, and Communication Division of the college being employed by many companies in Pennsylvania and in other states.

The Division has gained prominence. One indication of this is the large number of out-of-state applicants to the program relative to other programs at the college. Achieving national exposure involved:
- Keeping professional journals aware of what we are doing.
- Soliciting contributions of equipment and supplies from national companies.
- Attending national conferences, expositions and workshops providing opportunities to speak with industry leaders about La Roche College programs.
- Participating in speaking engagements for industry groups around the nation.
- Maintaining active memberships in national professional and academic organizations.

Much of my time in developing the Communication program was spent forming its philosophy, structure, and course guides. While the program serves many communications disciplines, its focus is on organizational, interpersonal, corporate, and mass communication. Due to the interdisciplinary nature of this program it required close coordination with faculty and chairs of other divisions prior to its acceptance by the Academic Senate.

During my years at La Roche College, my teaching responsibilities spanned four academic areas: Graphic Arts, Communication, Administration and Management, and Human Resources Management (HRM). The focus of my last course development at La Roche was in Communication and HRM. HRM is a graduate program and I devoted much time to the development of a graduate course: Organizational Communication.

Although I chaired the Graphics, Design, and Communication Division, my main concern as an academician and division chair was to ensure that students received a high quality education that did justice to their professional and academic development while also meeting the liberal arts missions, objectives, and goals of the College. This was achieved by teaching each course from a position of strength which means that all faculty members in the division remained current in the developments, structure, and research in the fields which were taught. I am also sensitive to the importance of communication skills in all areas, and I believe that my students at La Roche would attest to the fact that the importance of clear writing and articulate speaking was emphasized in each of my courses. This philosophy was pervasive in all courses in the division that I chaired. I would bring this philosophy to any position that I may hold.

As Chair of the Graphics, Design, and Communication Division, I was responsible for a staff of full-time and adjunct faculty members, and all hiring, scheduling, purchasing and budget management of the division. In the Communication area, which was new, I developed a qualified faculty of full-time and part-time teachers, planned the development of a laboratory, and I established an advisory committee of educators and professionals to monitor the program's direction.

Graphic Arts Technical Foundation (GATF): 1968-1976

Between 1968 and 1976 I was involved in administration, technical services, education, and research for GATF. GATF is a leader in graphic arts research and education in printing, publishing, and other graphic communication fields. As such, the standards for research, education, and professional development at GATF are parallel to those of major industry associations, research organizations, and academic institutions.

I was an Associate Director at GATF and responsible for managing the activities of a staff of professionals at the Foundation's headquarters and in other cities. These activities included program and publication development, professional development, scheduling of technical auditing and testing, and technical report preparation. I was also responsible for designing, coordinating, and conducting technical audits and for performing technical consulting for GATF member organizations in North America and abroad.

An outcome of GATF's research, consulting, product evaluations, and testing is published papers and textbooks, and professional seminars and workshops. While at GATF I published six papers and one textbook.

I also was the architect of several seminars and workshops on a variety of subjects and was responsible for coordinating and presenting them. These educational programs were designed for professionals on the management and technical levels of the graphic arts, and ranged in length from one day to three days. These programs were also conducted throughout North America and abroad.

Summary

I believe that my accomplishments as an academic chair and department head result from pursuing just and professional relationships with faculty and staff members, and in striving to maintain clear channels of upward and downward communication. Personally, I subscribe to an administration and management philosophy that includes:

(1) Management by "exception," i.e., allowing decisions to be made at the lowest appropriate level.
(2) Emphasizing the importance of complete staff work.
(3) Supporting and promoting the concept of academic freedom.
(4) Focusing on outcomes achieved through acceptable processes.
(5) Helping individuals to maximize their strengths and minimize weaknesses.
(6) Surrounding myself with qualified staff and delegating responsibility and authority.
(7) Maintaining open channels of upward and downward communication, telephone communication, and electronic communication.
(8) Maintaining an "open door" policy whenever possible for students, faculty and staff members.
(9) Encouraging an atmosphere of no secrets and no surprises.
(10) Complimenting the individual when tasks are accomplished as planned and looking first to "system" breakdowns when they are not.

(11) Maintaining sound management controls in achieving balanced budgets.

I believe that my record as professor, scholar, researcher, and administrator, and particularly my service to the universities and other organizations I have been affiliated with, is an indication of my commitment to excellence in education, management, technology, human resource development, and research and training.

PUBLICATIONS, PAPERS, BOOKS, ARTICLES, LETTERS

Levenson, Harvey Robert, "Printing," McGraw-Hill Encyclopedia of Science and Technology, McGraw-Hill, New York, New York (Manuscript in final editing and will appear in the next printed and on-line issues of the encyclopedia), 2003.

Levenson, Harvey Robert, "Graphic Arts Education and Training in the 21st Century, GATFWorld - Graphic Arts Technical Foundation 2002 Technology Forecast, Janaury/February, 2002, pp. 101-103.

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Levenson, Harvey Robert and Henry "Red" Heesch, "Graphic Communication Education and Training: A Vision for the 21st Century," GATFWorld - Graphic Arts Technical Foundation Technology Forecast, to be published in February, 2001.

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Levenson, Harvey R., Graphic Arts and Desktop Publishing Pocket Dictionary, Summa Books, Thousand Oaks, Calif., 1996, 256 pp.

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Levenson, Harvey R., "The Power of Print in America," Printing Impressions, 4/89.

Levenson, Harvey R., "The Role That Printing Plays in Society," (Letter, reprinted as an article under different titles in several publications including: "Print as a Medium Must Be the Message," Graphic Communications World, 1/25/88; "The Printing Industry's Image," Printing Journal, 2/88; "Attracting the Nation's Youth to the Printing Industry," Journal of Forms Management, May - July, 1988), Printing Impressions, 9/87.

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Levenson, Harvey R., "From McLuhan to Wilkens: Bridging the Technologies of Design, Print, and Telecommunications at Cal Poly," The Prepress Bulletin, July/August, 1985.

Levenson, Harvey R., "Technological Transitions in Graphic Communications: A Historical Perspective," Printed Letters (a monograph), Vol. 1, No. 3, Printing Industries of America, Arlington, Virginia, 1985.

Levenson, Harvey R., (Contributing author), "Education and Training in the Graphic Arts--1985-1990: The GATF Manpower Study," (Book), Techno-Economic Forecast 26, Graphic Arts Technical Foundation, Pittsburgh, Penna., 1985.

Hanks, William; Levenson, Harvey R. and Terry Pickett, "Citizen Involvement in Government Decision Making," presented at the International Communication Association (ICA) Annual Conference, Boston, 1982.

Levenson, Harvey R., "In Search of a Unity of Theory Between Behaviorism and Psychological Phenomenology for Explaining Human Behavior," Working Papers in Rhetoric and Communication, Vol. I, No. 1, Department of Speech and Theatre Arts, University of Pittsburgh, Pittsburgh, Penna., Winter, 1979.

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Levenson, Harvey R., "Multi-Color Overlay System: A New Copy Preparation Approach for the Artist," Technical Services Report, No. 19, Graphic Arts Technical Foundation, Pittsburgh, Penna., September, 1974.

DeJidas, Lloyd and Harvey R. Levenson, "Maintaining Production With Substitute Materials," Technical Services Report, No. 18, Graphic Arts Technical Foundation, Pittsburgh, Penna., July, 1974.

Levenson, Harvey R., "Sheet-Fed Printing of Lightweight Papers," Technical Services Report, Vol. 5, No. 3, Graphic Arts Technical Foundation, Pittsburgh, Penna., October, 1972, (reprinted in Printing Management Magazine, April, 1973).

Levenson, Harvey R., "Preventive Quality Control: Sheet-Fed Pressroom," Technical Services Report, Vol. 4, No. 4, Graphic Arts Technical Foundation., Pittsburgh, Penna., August, 1971.

Levenson, Harvey R., "GATF Reviews Solutions to Paper Generated Hickeys," Technical Services Report, Vol. 3, No. 3, Graphic Arts Tech. Foundation., Pittsburgh, Penna., November, 1970.

Levenson, Harvey R., "Removal of Moisture from Compressed Air Supplies," Technical Services Report, Vol. 3, No. 1, Graphic Arts Technical Foundation., Pittsburgh, Penna., June, 1970.

TELEVISION APPEARANCES AND RADIO PRESENTATIONS

KCBX-Radio, San Luis Obispo, Calif. Participated in a program dealing with adult illiteracy locally and nationally.

FYI-QUBE-TV, Warner Cable Corporation, Pittsburgh, Penna. Represented Pittsburgh Council on Higher Education (PCHE) to discuss the subject of telecourses via cable television.

Black Horizons, WQED-TV, Pittsburgh, Penna. Participated on panel to discuss minority involvement in the City of Pittsburgh's cable television franchising process.

Campus Connections, KDKA-TV, Pittsburgh, Penna. Moderated a program on Graphic Arts and Graphic Design Education at La Roche College.

PROFESSIONAL, TECHNICAL, EDUCATIONAL ASSOCIATION MEMBERSHIPS AND APPOINTMENTS (Past and Present)

Danforth Foundation-Faculty Associate

Graphic Arts Technical Foundation Education Department Steering Committee

Pittsburgh Advertising Club

Pittsburgh Radio and Television Club

Printing Industries Association of Western Pennsylvania

Speech Communication Association

Technical Association of the Pulp and Paper Industry

Technical Association of the Graphic Arts, formerly on Board of Directors

Technical Association of the Graphic Arts, former Chair of Student Chapters Committee

Technical Association of the Graphic Arts, former Chair of Electronic Pre-Press Committee

Technical Association of the Graphic Arts, Chair of Local Committee for 30th Anniversary Conference, 1978

Technical Association of the Graphic Arts, Chair of Local Committee for annual conference, 2001

Gravure Association of America

San Luis Obispo Literacy Council, Board of Directors

Academic Advisory Council of the U. S. Government Printing Office, Chair

Printing-Expo (professional exposition), chair

Graphic Arts Literacy Alliance, formerly Chairman of the Board

Accrediting Council for the Collegiate Graphic Communications, Board of Directors

Bangladesh Institute for Graphic Communication, Advisory Board

Electronic Document Systems Foundation, Advisory Board

Chair of Accreditation Committee of the Accrediting Council for Collegiate Graphic Communications (ACCGC)

Accreditation Committee of the Accrediting Council for Collegiate Graphic Communications (ACCGC) Board of Directors

I. O. Technologies / Shanghai Training Center / NPES China Initiative Advisory Board

President of Accrediting Council for Collegiate Graphic Communications (ACCGC)

PRESENTATIONS, SEMINARS AND SPEAKING ENGAGEMENTS (1980 - Present)

I have presented in over 300 seminars, workshops, conferences, and special meetings in printing and communication-related areas. A list of these activities is available upon request.

CURRICULUM DEVELOPMENT

As a Department Head at Cal Poly, I work with the faculty on all aspects of curriculum development. I participate in curriculum reform and regularly assist the faculty and provide advice as an ad hoc member of the department's curriculum committee. I also worked closely with the faculty curriculum committee in developing a Graphic Communication minor to support the curricular needs of other departments in the College of Liberal Arts. I have also coordinated the curriculum development for a Masters of Business Administration / Graphic Communication specialization in Document Systems Management.

PROJECTS AND RESEARCH

As a Department Head at Cal Poly, I oversee or work closely with the faculty on all senior projects and most other student research in the department. I have assumed this responsibility in order to be acquainted with the topics under study and to have input into the scholarship and overall quality of the research taking place. To this end I have developed criteria for students to follow in executing scholarly research methods and project reports. A number of senior projects produced by my students have been presented at professional conferences and published in journals.

ADVISING

As a Department Head at Cal Poly, I consider myself an advisor to all Graphic Communication Department students, and I personally advise the Student TAGA (Technical Association of the Graphic Arts) Research and Scholarship Committee. The committee's purpose is to address, via discussion and writing, current research and scholarly activities in the graphic communication profession.

Another aspect of my advising responsibility is to work with, along with a faculty advisor, a student managed and operated printing and publishing company. Called University Graphic Systems (UGS), this organization employs approximately 70 students

and produces the campus daily newspaper and other printing required by some of the university's departments. Through UGS, Cal Poly is the only university in the nation that produces a daily newspaper, sometimes in full color, entirely on-campus and by students. The students control as much as $500,000 in real money each year. While UGS does not interfere with the department's academic program, it provides the student employees with practical experience in running a business with all of its financial, management, personal, and production problems.

OTHER ACTIVITIES

Some other teaching-related activities I have influenced include bringing to campus visitors and guest lecturers from the profession to meet with faculty and classes. I have also encouraged faculty symposia and special lectures by faculty, and several years ago I developed and implemented a Distinguished Scholar Lecture Series. Additionally, I have prepared and submitted a position paper supporting foreign language study for all majors at Cal Poly. I have also offered the Graphic Communication Department as a resource and possible participant in international programs that the university is in and I participate in the Pacific Rim Institute. I have supported faculty and student participation in tours of the Italian printing and publishing industry sponsored by the Italian Trade Commission, and the European Study Program sponsored by Heidelberg West.

MEETINGS, CONFERENCES, WORKSHOPS, EXPOSITIONS (1980 - Present)

I have attended over 350 graphic communication-related meetings, conferences, workshops, and expositions. A list of these activities is available upon request.

MAJOR CONSULTING AND RESEARCH PROJECTS

Bowman and Brooke, Phoenix, Ariz. (Representing Pineapple Grove), Expert witness on print quality.

Hunter, Molloy & Salcido, Pasadena, Calif. (Representing R&W Enterprises), Expert witness on industry practices in the printing industry.

Jones Day, Atlanta, Georgia (Representing Scientific Games), Expert witness on patent infringements.

Electronic Document Systems Foundation (EDSF) Business-to-Business Multi-channel Customer Communications Study focusing on financial institutions.

Oppenheimer, Wolff & Donnelly, Palo Alto, Calif., (Representing Markzware), Expert witness on preflighting software for the graphic arts.

Hurst Chemical Company and Hurst Graphics, Los Angeles, Calif., consulting on market opportunities for direct-to-plate imaging technology.

Arter & Hadden, Irvine, Calif., (representing The Upper Deck Company). Expert witness on printing on plastic substrates.

Kenyon & Kenyon, New York, NY (representing Heidelberg Druckmaschinen, GERMANY), Expert Witness on patent infringements.

Lakeshore Learning Materials, Carson, Calif., Expert Witness on print quality of catalogs.

Kearney, Bistline & Cohoon, Los Angeles, Calif., (representing Toppan Printing Company, JAPAN), Expert Witness regarding color transparency quality related to the print quality of a travel booklet for a national account.

Base-Line Graphic Arts Products, Auburn, Wash., Strategic decision consultation on development and marketing of new product lines.

The Knowledge Company, Silver Spring, Maryland, Evaluation of Professional Graphic Arts Credentials for Foreign Nationals.

Treasure Chest Advertising Company, Glendora, Calif., In-plant Training Program for Classroom and On-site Training.

Scientific Games, Inc., Atlanta, Georgia, Feasibility Study on the Acquisition of a 15 Station Press for Printing "Scratch-Off" Lottery Tickets.

Compage, Inc., San Francisco, Calif., Development of International Printing Standards for Apple Computer Company.

Coastal Dining Club, Grover City, Calif. and The Image Factory, Santa Maria, CA, Feasibility Study on the Acquisition of Haagen Printing Company.

The Coca-Cola Company, Atlanta, Georgia, Analysis of Annual Report Production.

Mike Roberts Color Productions, Oakland, Calif., Technical and Communication Audit.

Ad/Vent Grafx (subsidiary of Southwest Bell), Dallas, Texas, Market Opportunity Study.

"Reader" for Delmar Publishing, Albany, New York.

HONORS AND AWARDS

Danforth Foundation Faculty Associate.

Graphic Arts Technical Foundation "Award of Excellence."

U. S. Government Printing Office "Distinguished Service Award."

San Luis Obispo (Calif.) Economic Opportunity Commission "Board Member of the Year."

California Polytechnic State University "Meritorious Performance and Professional Promise Award."

Technical Association of the Graphic Arts has established an annual student research award entitled: "$1,000 Harvey R. Levenson Student Paper Award."

Selected to moderate a news conference on literacy for Dr. Lauro Cavazos when he was Secretary of the United States Department of Education.

Acknowledged by Mrs. Barbara Bush, former "First Lady of the United States," for supporting the nation's literacy efforts.

Invited to The White House by former President George Bush to participate in the National Literacy Honors Program.

Printing Industries Association of Southern California, Industry Service Award (for promoting literacy and the graphic arts).

California Polytechnic State University various meritorious performance awards (for meritorious teaching and a record of service and professional accomplishments).

Elected to the "Society of Fellows," for contributions made toward the advancement of graphic arts technology, Graphic Arts Technical Foundation, Sewickley, Penna.

Printing Industries Association of Southern California "Educator of the Year" and recipient of the 2004 Jack Simich Award.

Technical Association of the Graphic Arts (TAGA) 2004 TAGA Honors Award.

New York City College of Technology Gamma Epsilon Tau 2004 "Golden Key Award."

UNIVERSITY COMMITTEES

Cal Poly

Academic Senate General Education and Breadth Committee

Academic Senate General Width and Breadth, Technology Subcommittee

Academic Senate Intellectual Property Committee

Academic Senate Long Range Planning Committee

Academic Senate Research Committee

Academic Senate University-wide Committee on Intellectual Property

College of Liberal Arts committee for a Multimedia Masters degree

College of Liberal Arts Computer Committee

College of Liberal Arts Computer Technician Search Committee

College of Liberal Arts Search Committee of a computer technician

College Strategic Planning Committee

Diversity Design Contest

Interdisciplinary coordination of publication of book entitled "Folk Photography—Poem's I've Never Written."

International Agricultural Development Program Committee

Pacific Rim Group

President's University Advancement Forum

President's Cabinet Committee for Resources and Development

Search Committee for Dean, School of Professional Studies and Education

Search Committee for Upward Bound Program Director

Tom Flores Golf Tournament committee

University Commencement Speaker Selection Committee

University Logo Committee

Western Association of Schools and Colleges (WASC) Accreditation Committee

Writing Proficiency Exam reader

As Department Head am ex-officio on all department administrative committees including Curriculum, Budgets, Laboratory Development, Fund Raising, Faculty and Staff Development, Industry Relations, Staffing and Productivity, and Recruiting.

La Roche College

Acting Chair for Communication Program Steering Committee

Chair of Committee on Quality Undergraduate Education (QUE)

Curriculum Review Committee

Human Resources Management (HRM) Graduate Program Steering Committee

Pittsburgh Council on Higher Education (PCHE) Television Consortium

President's Planning Commission

Search committees for Academic Dean, Humanities faculty, Administration and Management faculty, Graphics, Design, and Communication faculty, Natural Sciences faculty

Student Honors Committee

COMMUNITY SERVICE

San Luis Obispo (County), Calif.

San Luis Obispo County Media Task Force, elected by the City Council of the City of Atascadero, Calif.

Serving on Graphic Arts ROP Advisory Board for Atascadero (Calif.) High School.

Atascadero Babe Ruth Baseball League development of programs for Tournaments hosted by Atascadero.

Coordination of a proposal for an "electronic university" for the City of Paso Robles, Calif.

Board of Directors member of the Atascadero Sox semi-pro baseball team.

Presentations to various service clubs, e.g., Kiwanis, Rotary, Lions, ALTRUSA, on Literacy in the United States, California, and San Luis Obispo County.

Advisor to the local Mozart Festival on matters pertaining to the publication and printing of brochures and other literature needed for the Festival.

Den Leader, Atascadero, Calif., Cub Scout Pack 153.

Board of Directors member, San Luis Obispo Literacy Council.

Coordinator and coach, Monterey Road Elementary School and Atascadero Junior High School, Atascadero, Calif., Chess Team.

Sponsor, Atascadero, Calif., Youth Little League.

Statistician and Photographer, Atascadero, Calif., Youth Football.

Chair, Fund Raising Committee, Atascadero, Calif., Boy Scout Troop 153.

Council Member, Monterey Rd. Elementary School Site Council, Atascadero, Calif.

Pittsburgh, Penna.

Advisor in the Development of Women In Graphics, a Pittsburgh organization to enhance the status of local women in the graphic arts and related fields.

Presented a position paper for a City Council public hearing regarding a cable television ordinance for the City of Pittsburgh.

Assisted the Bureau of Cable Communication, City of Pittsburgh, in reviewing Requests For Proposals (RFP) and other documents related to the City of Pittsburgh cable television franchise.

Advisor to individuals and groups developing community communication television programming.

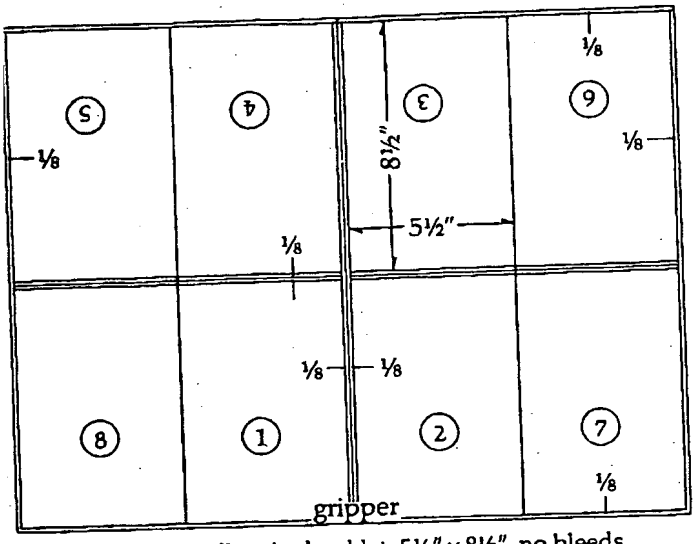
Advisor to the Town Council, Town of McCandless regarding the renegotiating of its cable television franchise.

Member of the Pittsburgh Council on Higher Education. Television Consortium and Chair of its Needs Analysis subcommittee which surveyed citizen interests in telecourses.

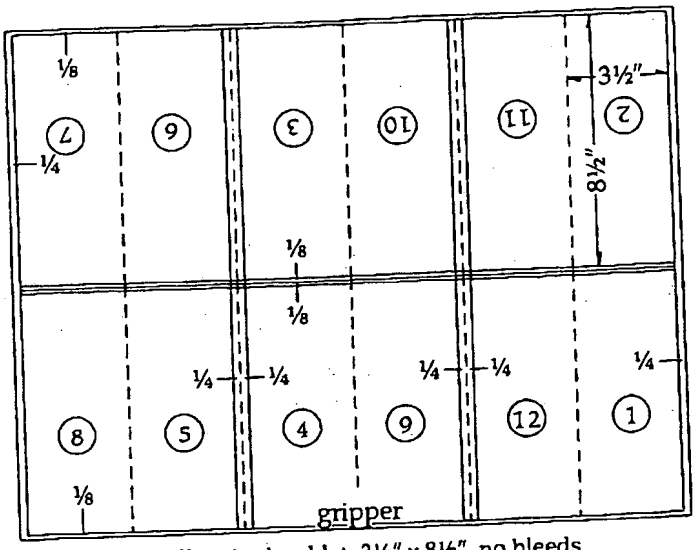
Coordinator of Professional Explorer Post which focused on careers in graphic arts, graphic design, architecture, and communication.

Common Paper Estimating Guide

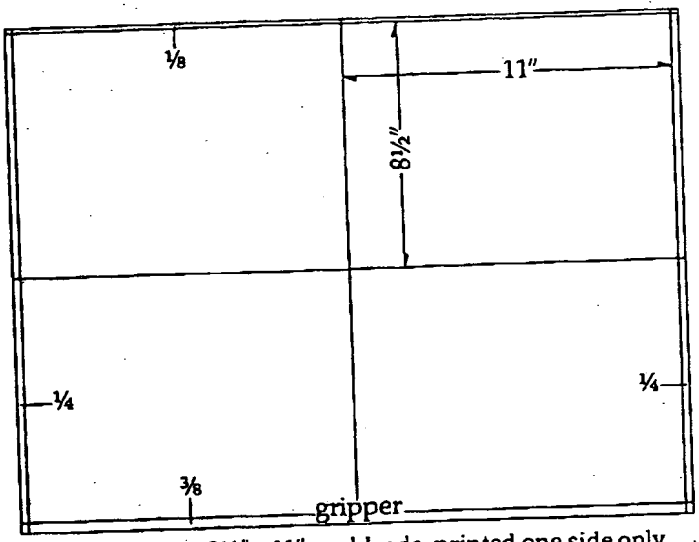
$17\frac{1}{2}$" x $22\frac{1}{2}$"



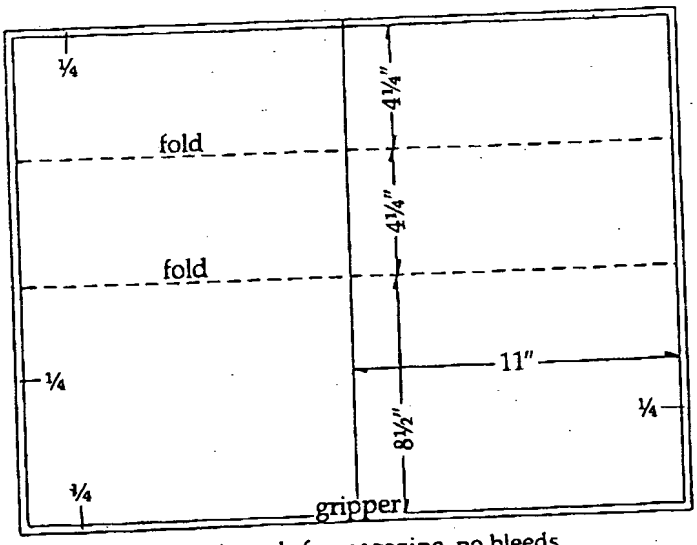
A. Eight page saddle wire booklet, 5½" x 8½", no bleeds



B. 12 page saddle wire booklet, 3½" x 8½", no bleeds



C. Catalog sheet, 8½" x 11", no bleeds, printed one side only



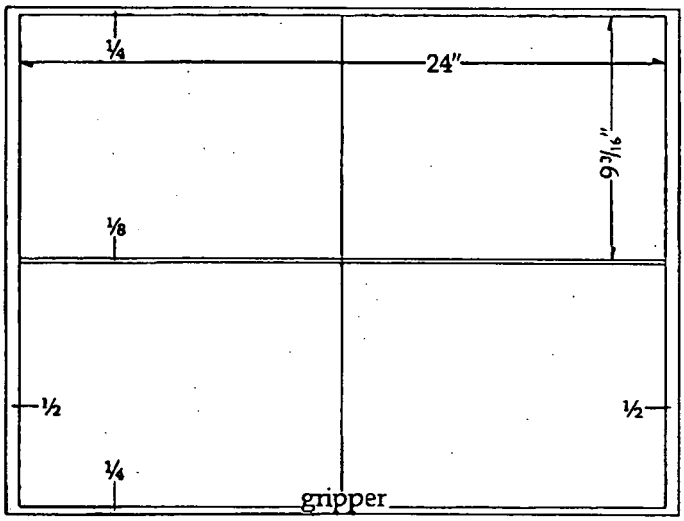
D. Fold-out with 2 panels for magazine, no bleeds

EXAMPLE: How to calculate press sheet requirements for the 8½" x 11" catalog sheet featured above:

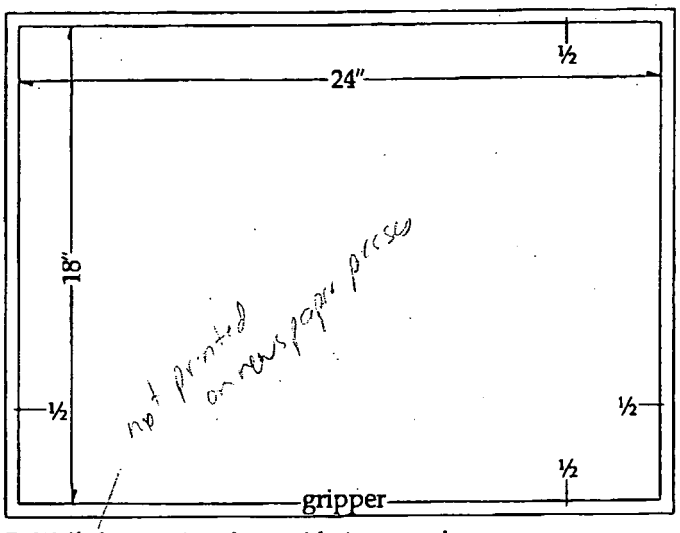
			NO. OF PAGES	FINAL QUANTITY	
FINISHED PAGE SIZE	8½" x 11"		ONE	20,000	
TRIM & BLEED	8¾" x 11¼"				
NO. UP ON 1 SIDE OF SHEET	2 x 2	=	FOUR	5000	GROSS SHEETS
IMAGE AREA	17" x 22"			+200	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	17½" x 22½"			5200	NO. OF SHEETS NEEDED FOR JOB

Note: To aid you in figuring pagination, we have circled page numbers and included imposition layouts in the back of the book.

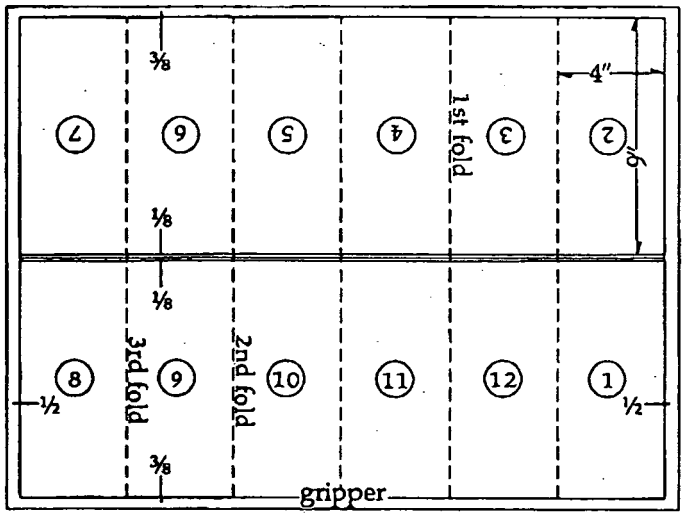
19" x 25"



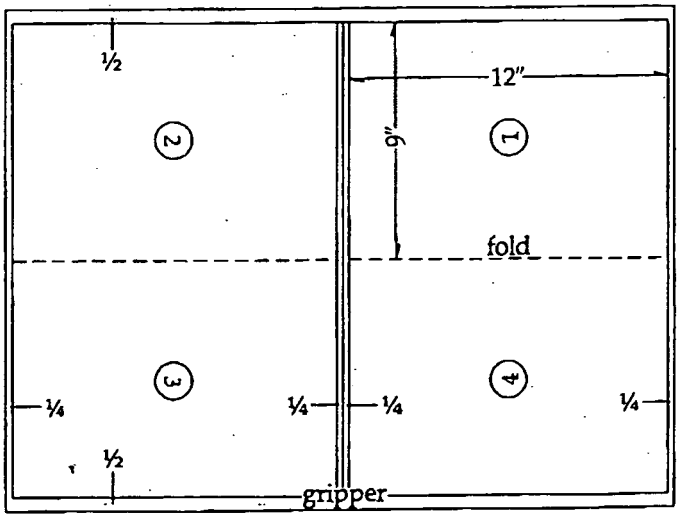
A. Book jacket – 9 3/16" x 24", 4 colors, 1 side, bleeds



B. Wall chart, printed one side in one color



C. Rack folder, 12 pages, run 2-up sheetwise (6 pages – 2-up on each side of sheet)

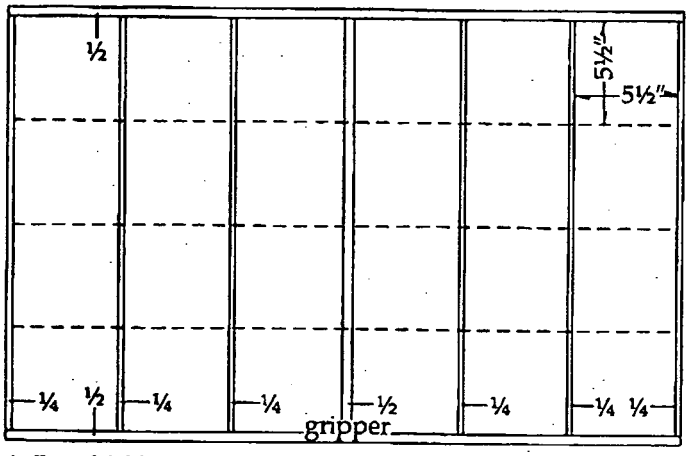


D. 4 page folder, 4 color process, run 1-up work and turn

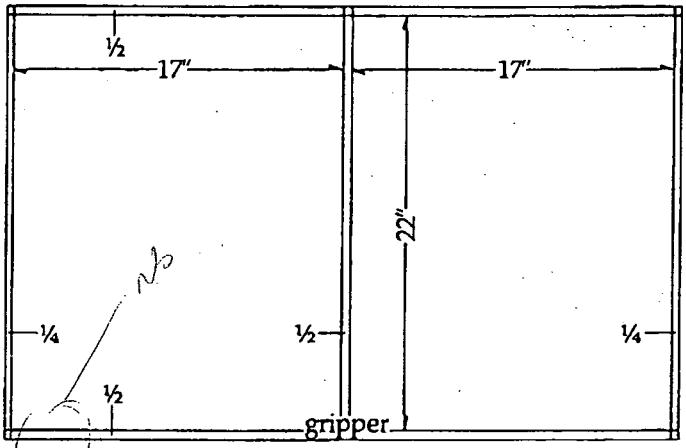
EXAMPLE: How to calculate press sheet requirements for the 12 page rack folder featured above:

			NO. OF PAGES	FINAL QUANTITY	
FINISHED PAGE SIZE	4" x 9"		12	14,000	
TRIM & BLEED	4" x 9¼"				
NO. UP ON 1 SIDE OF SHEET	6 x 2	=	12	7000	GROSS SHEETS
IMAGE AREA	24" x 18½"			+700	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	25" x 19"			7700	NO. OF SHEETS NEEDED FOR JOB

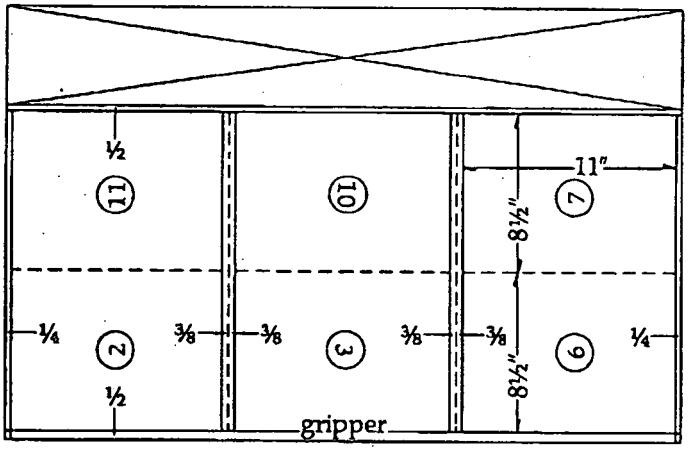
23" x 35"



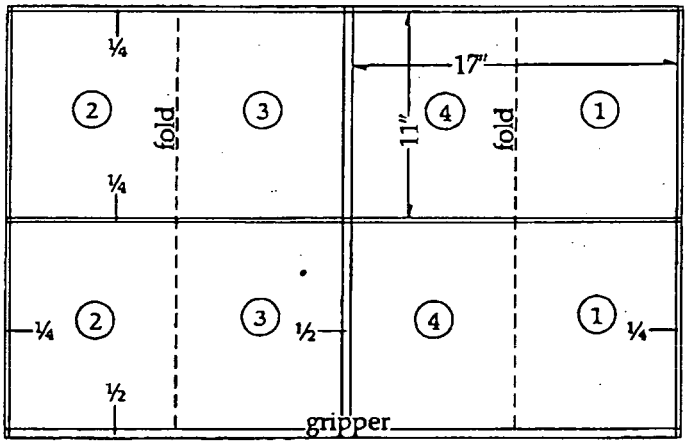
A. Barrel folder, run 3-up work and turn, 6 copies out



B. Poster, run 2-up sheetwise



C. 12 page self-cover booklet, run 1-up sheetwise—6 pages on front of sheet, 6 pages on back

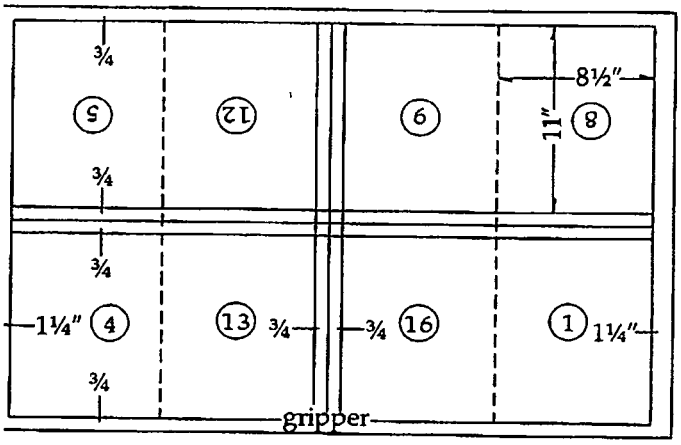


D. 4 page folder, run 2-up work and turn, 4 copies out

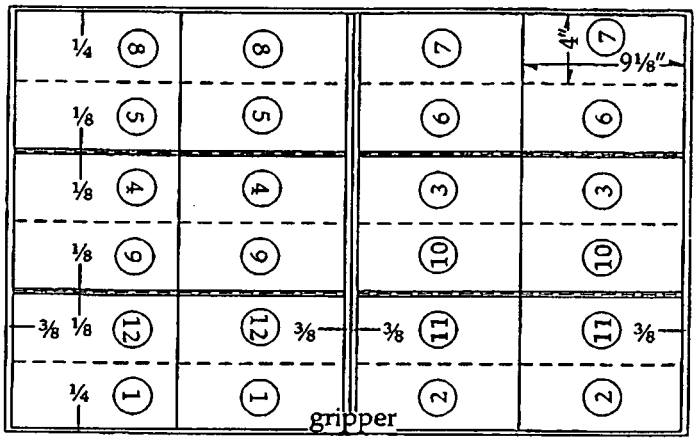
EXAMPLE: How to calculate press sheet requirements for the 12 page self-cover booklet featured above:

			NO. OF PAGES	FINAL QUANTITY	
FINISHED PAGE SIZE	8½" x 11"		12	15,000	
TRIM & BLEED	8⅝" x 11¼"				
NO. UP ON 1 SIDE OF SHEET	2 x 3	=	6	15,000	GROSS SHEETS
IMAGE AREA	17¼" x 33¾"			+900	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	23" x 35"			15,900	NO. OF SHEETS NEEDED FOR JOB

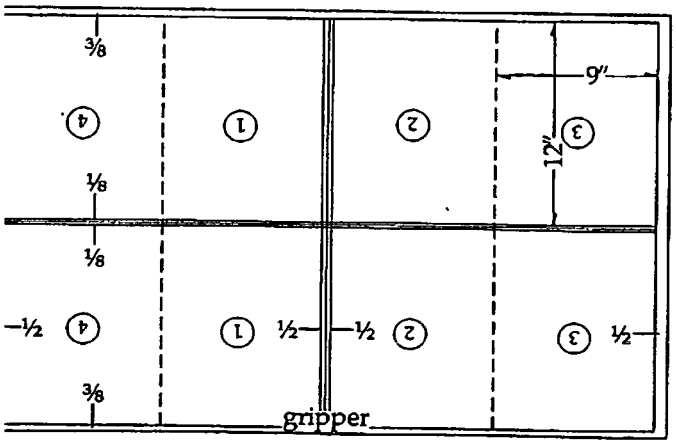
25" x 38"



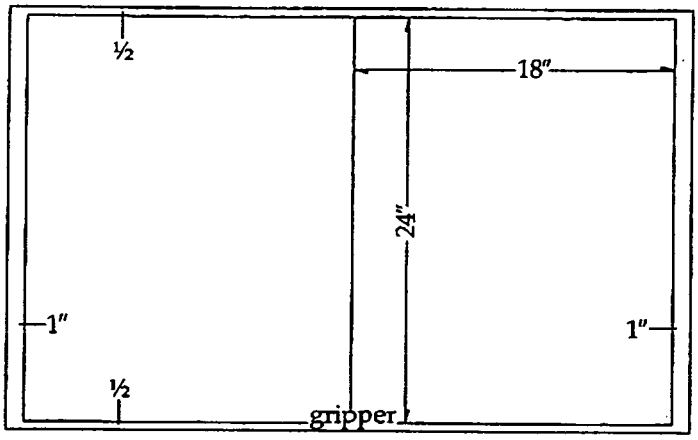
. 16 page self-cover booklet, run as 2/8's sheetwise in 2 colors plus bleed



B. 12 page self-cover booklet, run 2-up work and turn, 4 copies out in 1 color



. 4 page folder, 4-colors, run 2-up work and turn, 4 copies out of a sheet

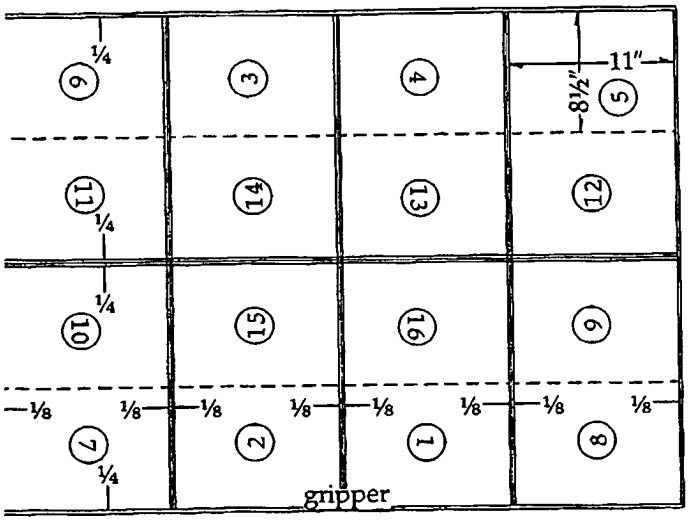


D. 18 x 24-inch posters, 1 color, bleeds

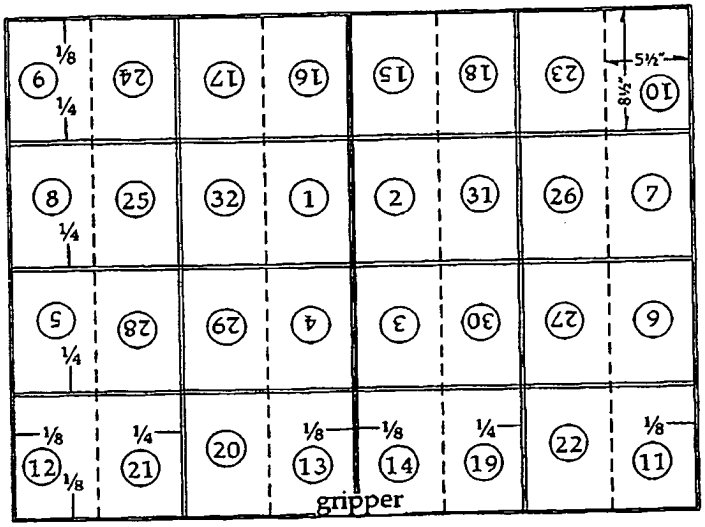
AMPLE: How to calculate press sheet requirements for the 4 page 4 color folder featured above:

			NO. OF PAGES	FINAL QUANTITY	
NISHED PAGE SIZE	9" x 12"		4	38,000	
IM & BLEED	9⅛" x 12¼"				
). UP ON 1 SIDE OF SHEET	4 x 2	=	8	9500	GROSS SHEETS
AGE AREA	24¼" x 36½"			+500	SPOILAGE ALLOWANCE
ESS SHEET SIZE	25" x 38"			10,000	NO. OF SHEETS NEEDED FOR JOB

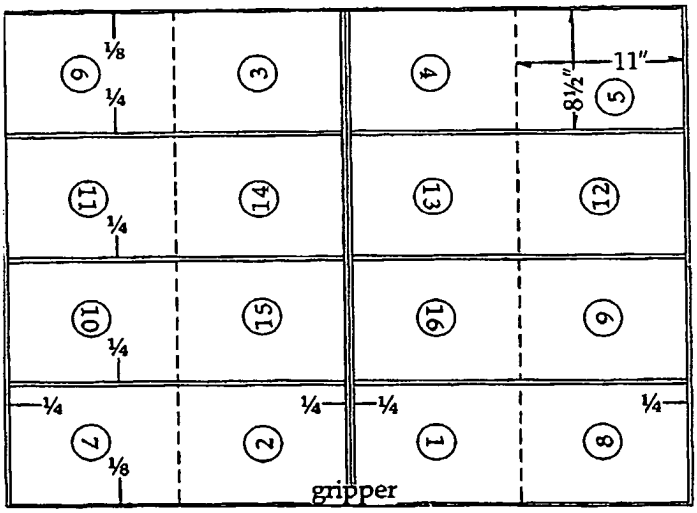
35" x 45"



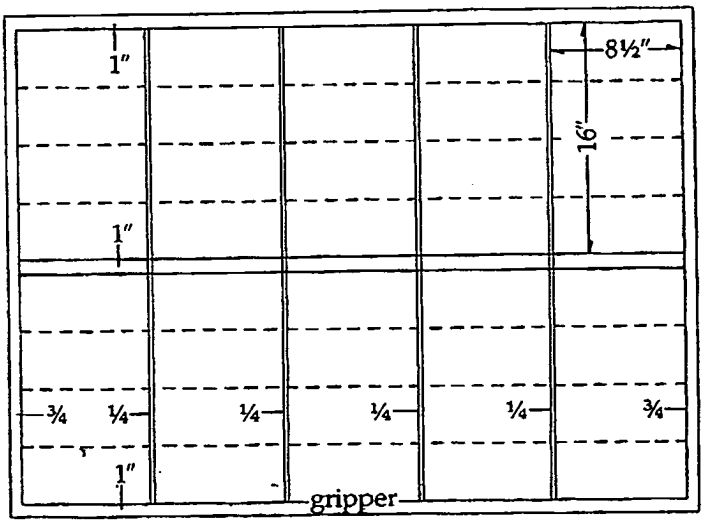
A. 16 page self-cover booklet, 2 colors, no bleeds



B. 32 page self-cover booklet, 4 colors, no bleeds



C. 16 page self-cover oblong booklet, 2 colors, run 1-up work and turn, 2 copies out of a sheet

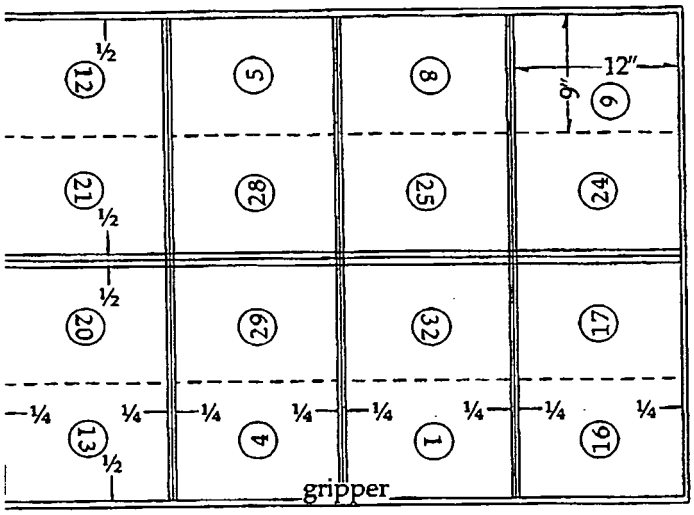


D. 8 page rack folder, run 5-up tumble, bleeds, 4 color process

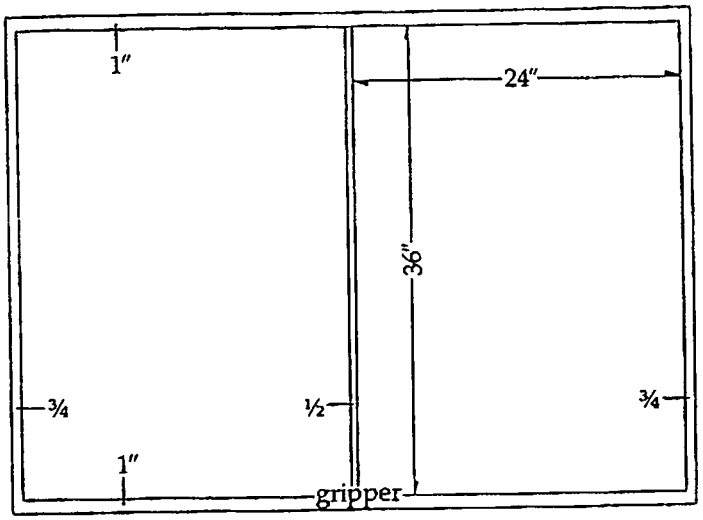
EXAMPLE: How to calculate press sheet requirements for the 16 page self-cover oblong booklet featured above:

			NO. OF PAGES	FINAL QUANTITY	
FINISHED PAGE SIZE	11" x 8½"		16	30,000	
TRIM & BLEED	11⅛" x 8⅝"				
NO. UP ON 1 SIDE OF SHEET	4 x 4	=	16	15,000	GROSS SHEETS
IMAGE AREA	34" x 44½"			+900	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	35" x 45"			15,900	NO. OF SHEETS NEEDED FOR JOB

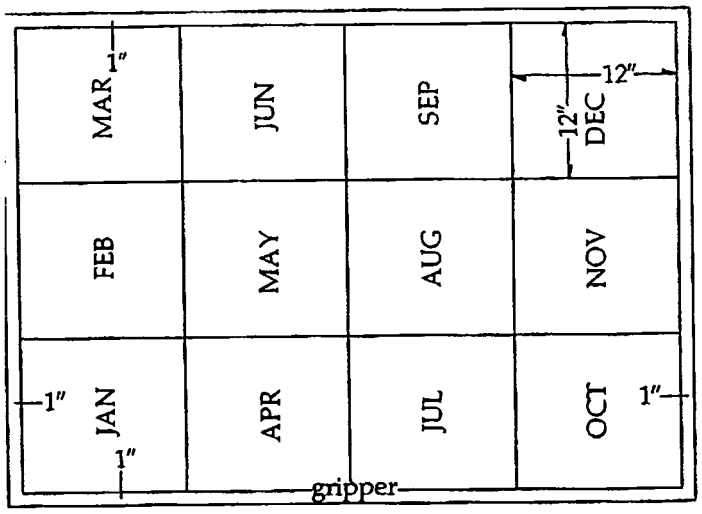
38" x 50"



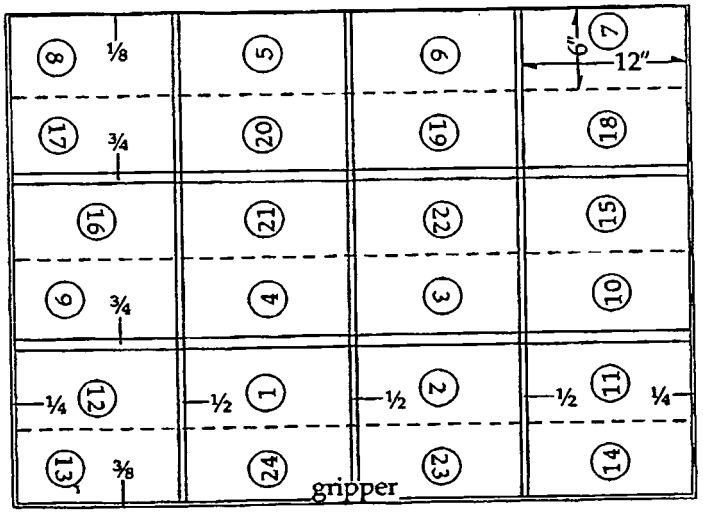
A. 32 page self-cover booklet, 2 colors



B. Large 4 color poster, run 2-up on 1 side



C. 12 sheet calendar, run 1-up of each in 1 color

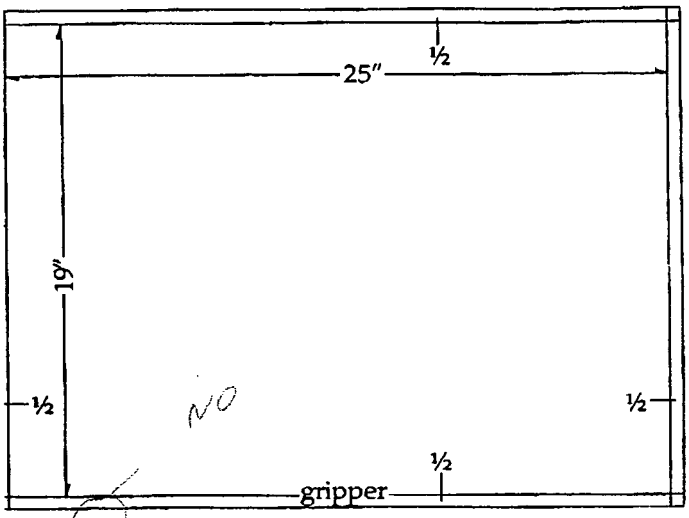


D. 24 page self-cover booklet, 2 colors

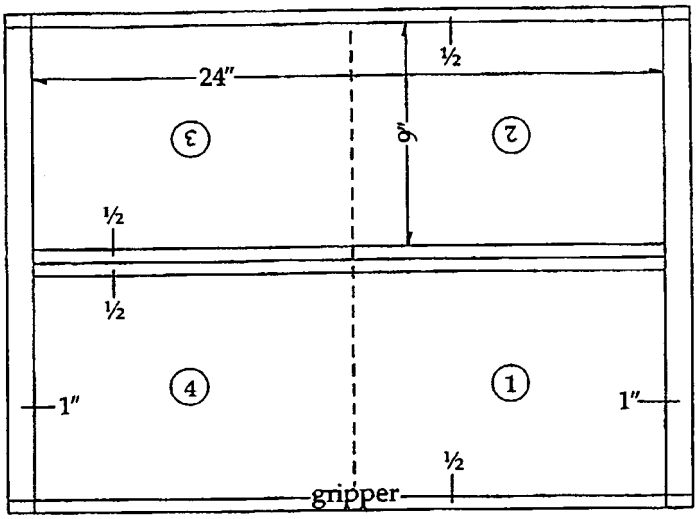
EXAMPLE: How to calculate press sheet requirements for the 12 sheet square calendar featured above:

			NO. OF SHEETS	FINAL QUANTITY	
FINISHED SHEET SIZE	12" x 12"		12	55,000	
TRIM & BLEED	12¼" x 12¼"				
NO. UP ON 1 SIDE OF SHEET	3 x 4	=	12	55,000	GROSS SHEETS
IMAGE AREA	36¾" x 49"			+2,750	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	38" x 50"			57,750	NO. OF SHEETS NEEDED FOR JOB

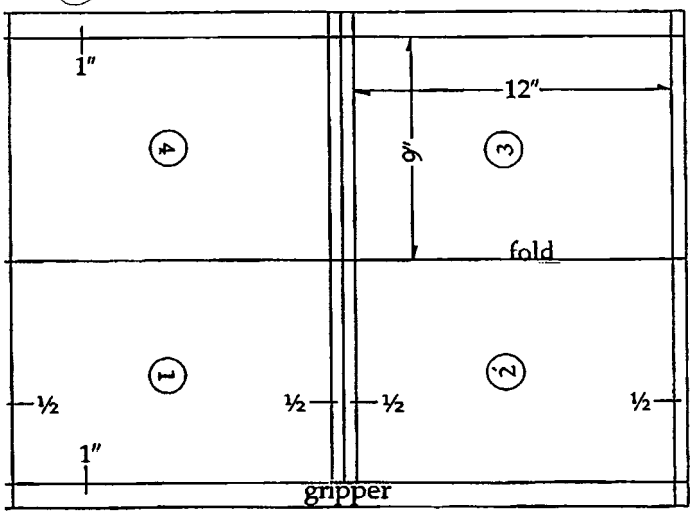
20" x 28"



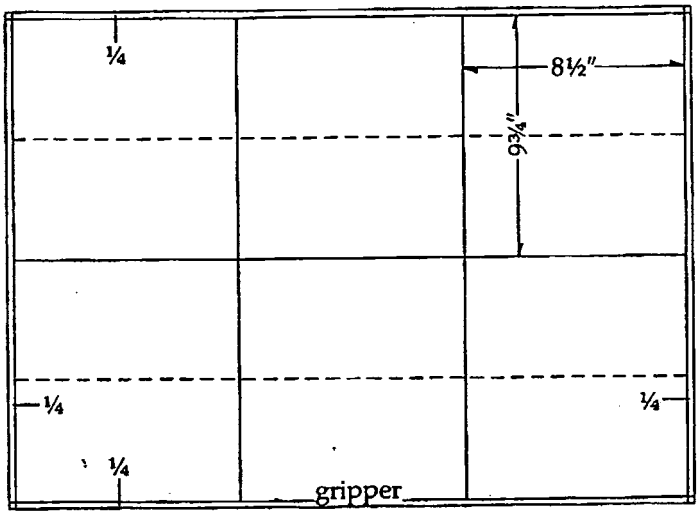
A. 4 color poster, run 1-up, on single color press



B. 4 page cover for oblong book, run 1-up tumble, 3 colors



C. 4 page cover, run 1-up work and turn, 2 copies out of a sheet

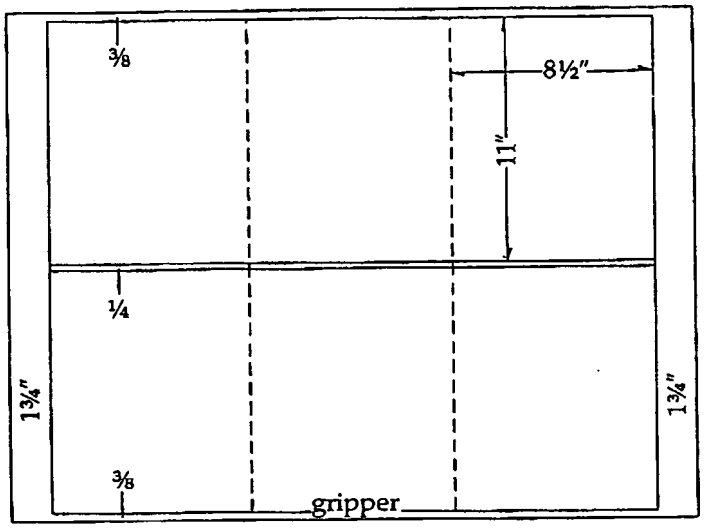


D. Hang tag, run 6-up sheetwise, 2 colors

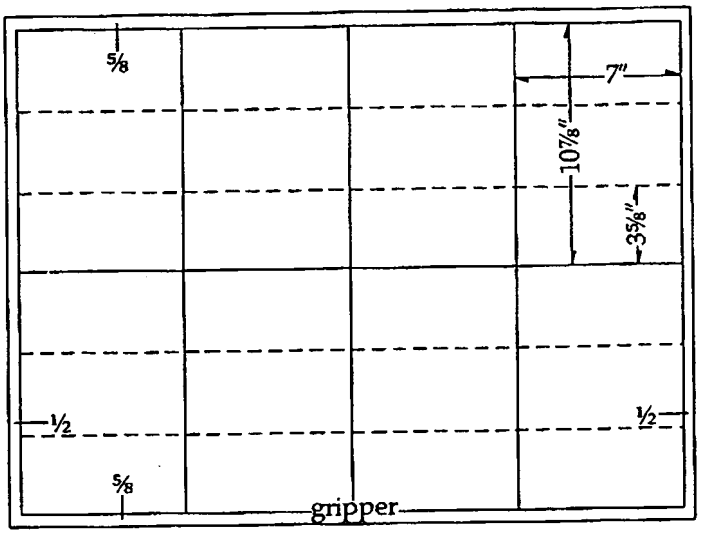
EXAMPLE: How to calculate press sheet requirements for the 4 page cover featured above:

			NO. OF PAGES	FINAL QUANTITY	
FINISHED PAGE SIZE	9" x 12"		4	50,000	
TRIM & BLEED	9⅛" x 12¼"				
NO. UP ON 1 SIDE OF SHEET	2 x 2	=	4	25,000	GROSS SHEETS
IMAGE AREA	18¼" x 24½"			+1500	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	20" x 26"			26,500	NO. OF SHEETS NEEDED FOR JOB

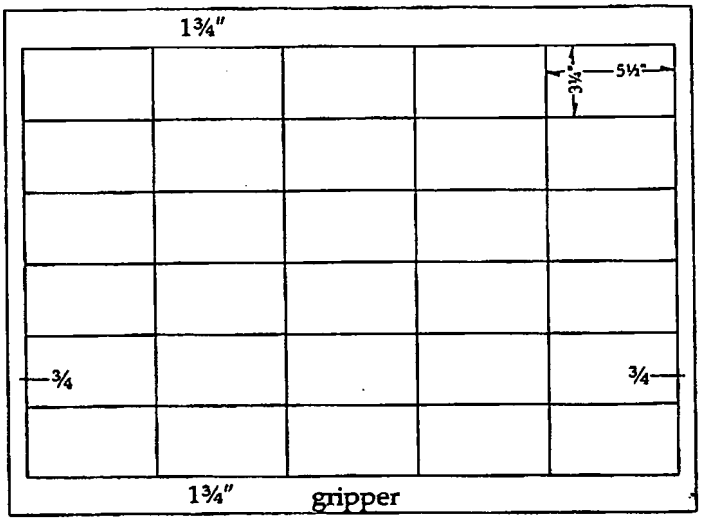
23" x 29"



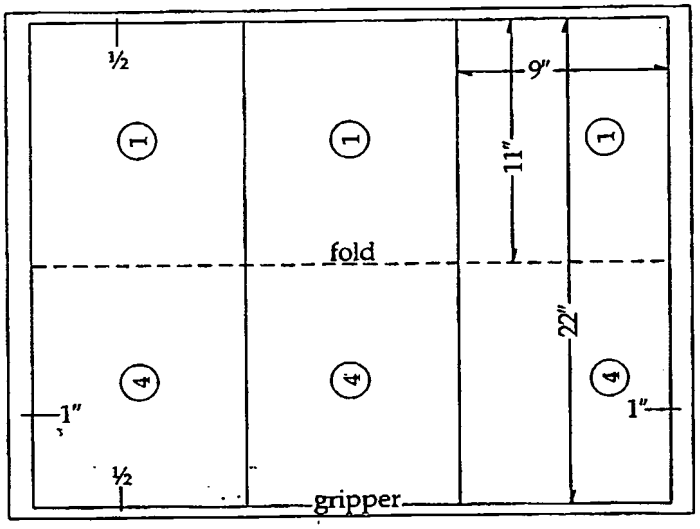
A. 6 page menu cover, run 1-up tumble, 2 colors



B. 6 page self-mailer, run 4-up work and turn, 8 copies out, 3 colors



C. Mailing card, printed 1 side in 4 colors, 30 cards out of a sheet

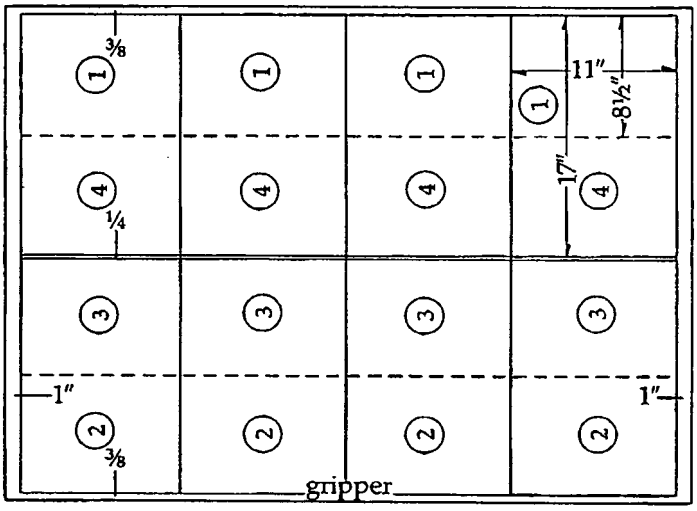


D. 4 page oblong cover, run 3-up sheetwise, 4 colors 1 side, black 1 side

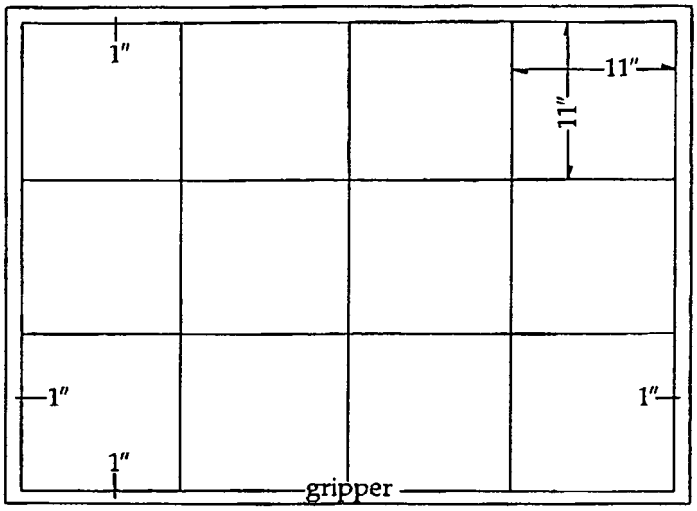
EXAMPLE: How to calculate press sheet requirements for the mailing card featured above:

			NO. OF CARDS	FINAL QUANTITY	
FINISHED CARD SIZE	5½" x 3¼"		1	200,000	
TRIM & BLEED	5¾" x 3½"				
NO. UP ON 1 SIDE OF SHEET	5 x 6	=	30	6,667	GROSS SHEETS
IMAGE AREA	21" x 28¾"			+733	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	23" x 29"			7,400	NO. OF SHEETS NEEDED FOR JOB

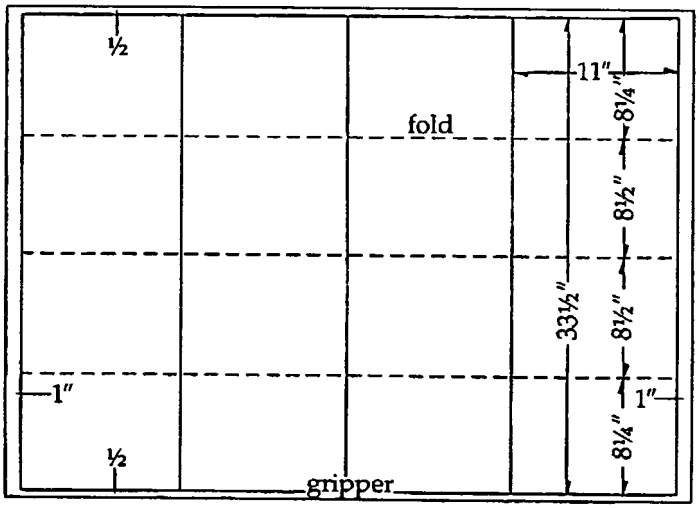
35" x 46"



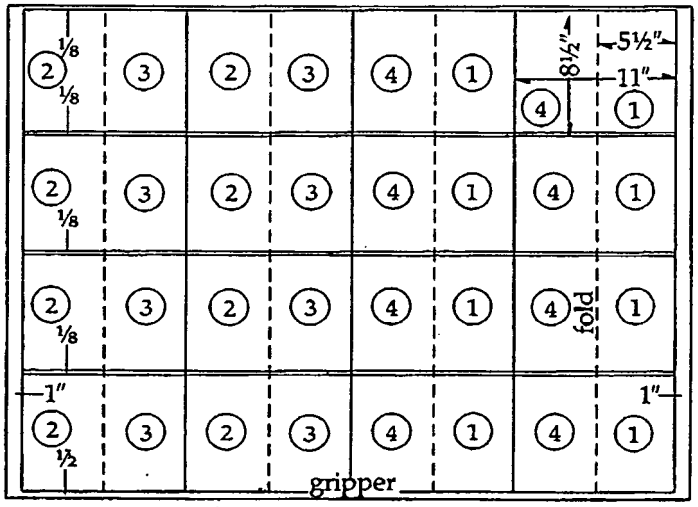
A. 4 page cover, run 4-up work and turn, 4 colors



B. 12 page calendar, bleeds, run 1-up on a sheet, 4 color process



C. 8 page gate folder, printed 2-up work and turn, 4 copies out of a sheet

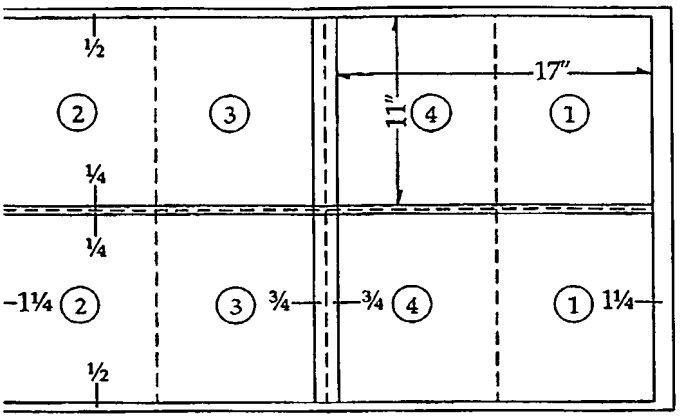


D. 4 page cover, no bleeds, run 8-up work and turn, 2 colors

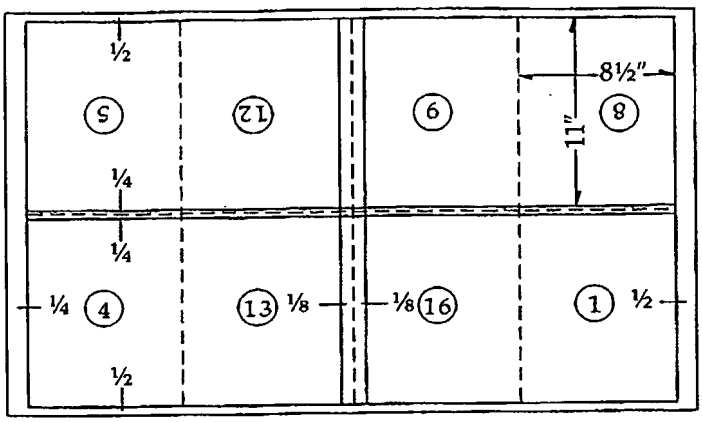
EXAMPLE: How to calculate press sheet requirements for the 8 page 2 color gate fold featured above:

			NO. OF PAGES	FINAL QUANTITY	
FINISHED PAGE SIZE	8½" x 11"		8	50,000	
TRIM & BLEED	8⅝" x 11¼"				
NO. UP ON 1 SIDE OF SHEET	4 x 4	=	16	12,500	GROSS SHEETS
IMAGE AREA	33½" x 45"			+800	SPOILAGE ALLOWANCE
PRESS SHEET SIZE	35" x 46"			13,300	NO. OF SHEETS NEEDED FOR JOB

ADDITIONAL
ROLL INFORMATION
FOR WEB PRINTING



. 4 page magazine insert, 11" x 17", run 4-up



B. 16 page booklet, 8½" x 11", run 1-up

The layout and stock requirements for a typical 4 page signature colors folded on the web press. 8½" x 38" maximum cutoff size.

PAGE SIGNATURE DELIVERED 4 OUT	
DUBLE FORMER FOLDER	
ET PRODUCTS	25,000
NDERY REQ. 2%	500
ET TO BINDERY	25,500
AKE READY	6,000
IN SPOILAGE 5%	1,250
ORE SPOILAGE 3%	750
OTAL	33,500
EIGHT M	131.6#
	4409#

The layout and stock requirements for a typical 16 page signature 4 colors folded on the web press. 22¾" x 36" maximum cutoff size.

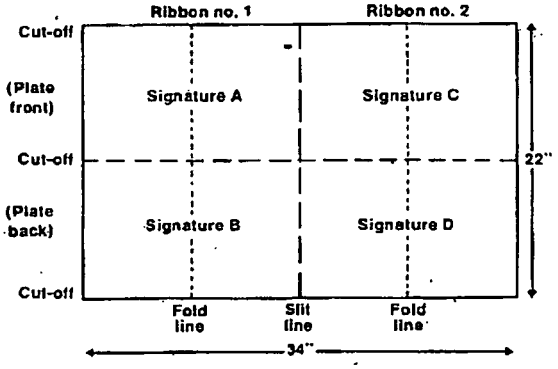
16 PAGE SIGNATURE DELIVERED 1 OUT	
SINGLE COMBINATION FOLDER	
NET PRODUCTS	100,000
BINDERY REQ. 2%	2,000
NET TO BINDERY	102,000
MAKE READY	6,000
RUN SPOILAGE 6%	6,000
CORE SPOILAGE 3%	3,000
TOTAL	117,000
WEIGHT M	120.7#
	14122#

Double Former Products

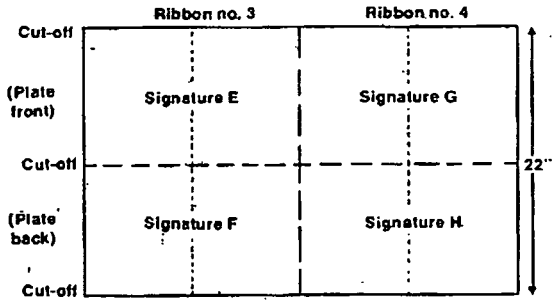
Fig. 73 Unlike a combination folder, there are no folding options within a double former folder. The format of the delivered product is determined by page imposition and press webbing in advance of the folder. The following example shows why this is so.

A six-unit press with an impression length of 22" is to run two 34" webs. One web is to take four colors and the other, two. Both, of course, are to be perfected. The design of the job, however, requires that full-color illustrations be spread evenly throughout the bound book. Therefore, both webs will be slit in half, and one ribbon from each will run over each former. The following two drawings show the page imposition for each web. Individual page numbers are omitted for simplicity's sake although they are, at this point, fixed.

FOUR COLOR WEB (34")

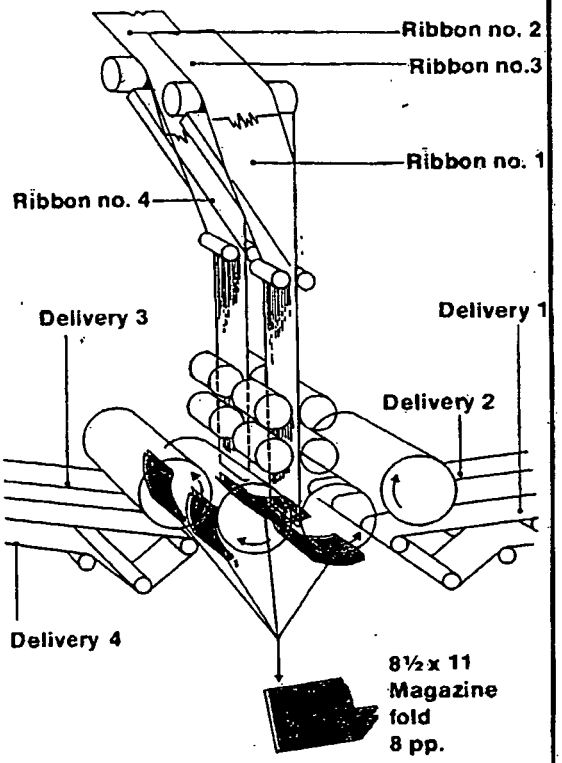


TWO-COLOR WEB (34")



The impression length of each web carries four 4-page signatures. After slitting and mixing, the ribbons cross the former, folding to 8½" wide. The top ribbon over the former always forms the outside pages of the signature.

Page imposition has required that plate-front signatures from each signature be delivered together. In this case, signature A must be delivered with signature E, not signature F. Furthermore, the pressman has set up the job to deliver plate-front signatures from both formers to the right and, alternately, plate-back signatures to the left. The results of these considerations can be summarized:



DELIVERY	INSIDE SIG.	OUTSIDE SIG.
1	E	A
2	C	G
3	D	H
4	F	B

One other general rule applies to planning work for a double former; delivered signatures should contain the maximum possible number of pages to minimize bindery handling. Actually, unless the above job were a combined run, all four ribbons could be run over a single former. Delivery would be of two 32-page signatures. Signatures A, E, G, and C (going from outside to inside pages) would appear at delivery 1. Signatures B, F, H, and D would appear at delivery 4. Note that such a change would force a change in page imposition.

lay-sheet, emulsion-side up, to correspond with a face-down folder dummy, and then turn the lay-sheet over before exposing the plate.

After the negatives for a plate are all arranged and positioned in the above manner the lay-sheet is turned over and the lay-sheet masking paper is cut away over each type page.

It is sometimes possible to attach the negatives to the bottom side of the lay-sheet. When this is done, the lay-sheet is not turned over and the page numbers must correspond with the face-up folder dummy.

Lay-Sheets for Surface Plates and for Deep-Etch Plates. The foregoing applies specifically to the positioning of negatives on a lay-sheet for surface plates. When positives are used for deep-etch plates, a transparent key sheet is sometimes used in place of a lay-sheet but the fundamentals of imposition (arranging and positioning the pages) require the same detailed information and involve identical figuring.

Regardless of page size or number of pages, the fundamentals are the same. We need a page layout or equivalent information shown in any way. We need a folder dummy, made or approved by the person in charge of folding and showing the best way to fold a sheet containing the specified number of pages. We prepare a lay-sheet showing the paper line and the centers of the head-margin gutters and the bind-margin gutters. We place the pages to correspond with the face-up or face-down folder dummy depending on whether the negatives are attached to the top side or bottom side of the lay-sheet. We position each page at the head and bind edge.

Imposition, Stripping and Paste-Up. There is a tendency to confuse imposition with stripping and paste-up. Generally stripping and paste-up are involved in making up a page or unit; imposition is the arrangement and positioning of the made-up units.

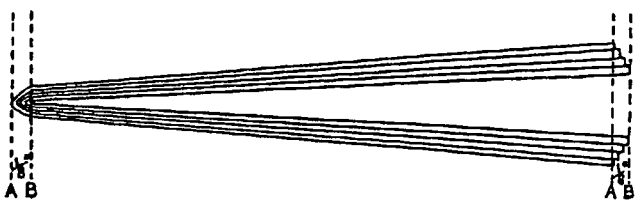
However, there are other factors we need to consider, specifically: (1) Different kinds of binding, and (2) Different kinds of imposition.

KINDS OF BINDING

The various kinds of binding are of interest to the man who prepares the page layout depending on whether or not they influence the visible margin at the bind edge.

The saddle stitch, sewed job or glued job permits the bound job to show the entire bind margin. These require no consideration with one exception — the saddle stitch "push-out."

Saddle Stitch Push-Out. When a number of signatures are inserted, one inside the other for a saddle stitch,



Illustrating the push-out on a saddle-stitched booklet.

each folded signature is pushed out slightly, about $\frac{1}{32}$" for each 16-page signature of .003" stock with a resulting loss of the outside margin. Allowance is made for this by reducing the bind-margin gutter and adding this amount to the outside-margin gutter every three or four signatures on a many-signature job.

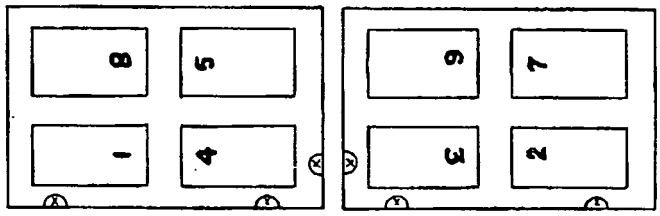
Extra Bind Margins on Side-Stitched Binding. On a side-stitch, pasted binding or fastener that does not permit the job to open up to the fold, allowance must be made in the page layout for the amount of bind margin that is lost (for example, on a side stitch where the stitches are placed in the stock about $\frac{1}{4}$" from the binding edge). We must allow for this $\frac{1}{4}$" plus extra bind margin lost.

Preparing a Binding Dummy. The best way to determine how much is lost is to make up a blank dummy and stitch it, then observe just how much of the bind margin is lost. Such jobs require more stock, less margins or narrower type pages than if saddle stitched, sewed, glued or spiral bound. Many side-stitched jobs must allow $\frac{3}{8}$" extra for lost bind-edge margin.

KINDS OF IMPOSITIONS

Different kinds of impositions are employed depending upon press and folder sizes, length of run, nature of job and other factors. Those most commonly employed are as follows: (1) Sheetwise, (2) Work-and-turn, and (3) Work-and-tumble.

Sheetwise Impositions. When a different plate is used for each side of the sheet with the same gripper edge, the imposition is termed sheetwise.



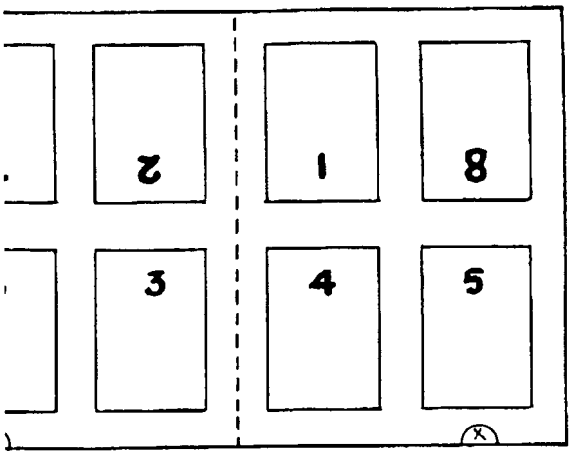
Two 4-page sheetwise plates for an 8-page booklet.

Work-and-Turn Impositions. When one plate is used for both sides of the sheet with the same gripper edge. the imposition is termed work-and-turn.

Work-and-Tumble Impositions. When a sheet is turned for back-up so that the gripper edge on the first side becomes the tail edge for backing up, this is termed work-and-tumble. It can be printed with one plate for both sides or a separate plate for each side depending on the nature of the job.

Any job with pages on both sides of the sheet can be printed with two sheetwise plates. Most such jobs can be printed with one work-and-turn plate. We illustrate this with an 8-page booklet. The folder dummy is 8 pages. The job could be printed with two 4-page sheetwise plates or one 8-page work-and-turn plate.

Back-Up on Different Impositions. It will be observed that with the two sheetwise plates, pages 2, 3, 6 and



age work-and-turn plate for an 8-page booklet.

e plate back-up pages 1, 4, 5 and 8 on the other ow on the 8-page work-and-turn plate, observe how 3, 6 and 7 on half of the plate back-up pages 1, 4, on the other half of the plate when the sheet is ver.

ork-and-turn plate produces two printed copies and king up, the sheet is cut in half.

er Dummy and Imposition. One 8-page folder is used for either the sheetwise or the work-and- positions. For sheetwise impositions one side of the ummy shows the pages that go into one sheetwise he press guide edges should be the same as the uide edges. For the 8-page work-and-turn imposi- short dimension folder guide edge becomes the ipper edge and the long dimension folder guide comes the cut edge in the center of the press sheet. e of the folder dummy becomes half of the work- plate.

	6	1
	7	12
	8	11
	5	2

rk-and-tumble sheet printed with one plate. This page booklet on 17" x 28" stock. The back edge rst side becomes the gripper edge for the back-up page 1 will back-up page 2. After printing, the cut on the heavy line, producing two identical sections. Two sheetwise forms would have to run rip of paper 8½" x 28" and would double the ions.

Work-and-tumble sheets are printed only when conventional impositions are not practical. Work-and-tumble sheets should be trimmed to produce uniform size around the cylinder.

Selecting the Right Kind of Imposition. The choice between sheetwise and work-and-turn impositions involves number of pages, sheet sizes, length of run, press and folder capacities and any other factors which determine the number of press impressions and the number of sheets to be folded. With few exceptions, the aim is to produce the job on the equipment available at the lowest cost and this is basically a matter of mathematics.

Reduced Spoilage. In some cases the matter of keeping spoilage at a minimum is a factor in choosing work-and-turn impositions. With sheetwise impositions more allowance must be made for spoilage to avoid re-runs when the back-up spoilage is excessive. With a work-and-turn imposition any shortage on back-up can be immediately made up with the plate on the press which prints both sides of the sheet. This permits reduced allowance for spoilage.

UNITS OTHER THAN PAGES

The arrangement and positioning of units other than pages require a unit layout or equivalent information. We must have the following: (1) Trimmed or diecut shape and size of unit, (2) Stock required for unit — allowance for bleeds and diecutting, and (3) Position of printed matter on unit stock.

On work where there is white space on all sides of printed matter, we need only know the unit stock size and the position of the print on this size, as a 3" x 5" print centered on 4" x 6" label.

Where bleed edges come together no extra stock need be allowed. A continuous print produces two bleed edges when two units are cut apart. Where a bleed comes next to an unprinted edge some extra stock must be allowed for cutting off the printing beyond the bleed. Sometimes the unit is composed of two or more individual units as in checkbooks, stamps, and cigar bands.

Unit Size and Stock Size. An individual check and stub may require $3\frac{1}{16}$" x $10\frac{15}{16}$" of stock. When this check is to be printed and bound in books, three to a page, the trimmed size would be $9\frac{3}{16}$" x $10\frac{15}{16}$". If $\frac{1}{16}$" trim was allowed for head, outside and foot of each book, the stock required for each untrimmed page of three checks would be $9\frac{5}{16}$" x 11". In this case a 3-check unit size would be practical. We could get 6 such 3-check units out of a 22" x 28" sheet as follows:

$9\frac{15}{16}$" x 11" unit size
3 x 2 = 6 out
$27\frac{15}{16}$" x 22" press sheet (28" x 22")

With small units like stamps or cigar bands a number of individual units are positioned on a negative. This group of images is a practical unit size and involves less figuring. Stamps $\frac{3}{4}$" x $\frac{7}{8}$" may be grouped 100-up on a negative, ten rows in each direction, requiring 7½" x $8\frac{3}{4}$" of stock. It is a simple matter to figure how many 7½" x $8\frac{3}{4}$" units come out

cylinder have to run with pressure between them to effect ink transfer; running contact is not enough. There must also be adequate pressure between the two blankets on a blanket-to-blanket printing unit (two printing couples in contact with each other at the blanket cylinders).

Pressure is more than essential in lithography, it is critical. Tolerances are small. Given today's trend in printing papers, presses, plates, and inks, the day is coming when the pressman's margin for error in squeeze may be as little as two or three thousandths of an inch.

The procedure for setting up cylinder pressures is called packing and should present no real difficulty. Packing problems all stem from procedures not being followed properly, or lack of true understanding of the principles involved.

The next three sections of this chapter will deal with the design of the printing unit cylinders and the techniques for packing them properly.

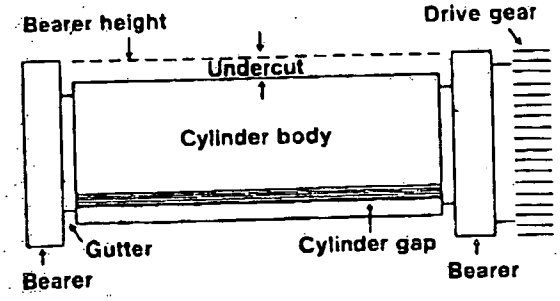
The Plate Cylinder

The basic features found on all plate cylinders are the same (see Figure 10). Almost all have bearers; smooth, flat, metal rings at the extreme ends of the cylinder. Just inside each bearer (between bearer and cylinder body) is a narrow groove, called the gutter. Between the two gutters is the main portion—the body—of the cylinder, on which the plate and packing are mounted.

The body of the cylinder is always lower than the surface of the bearers; the exact difference in height—called the cylinder undercut—varies with the specifications agreed on by the manufacturer and the printing plant. Often, the amount of undercut is specified by the plant ordering the press. Knowing the exact amount of undercut on the plate cylinder is essential to setting up proper pressures in the printing unit.

The surface of the plate cylinder body does not extend all the way around the cylinder circumference. On nearly all presses, a deep gap runs from gutter to gutter across the cylinder. This gap contains the clamping devices that hold the plate tightly onto the cylinder. These are the basic mechanisms of the plate lock-up.

Fig. 10 A printing-unit cylinder with the major elements labeled.



The leading edge of the plate cylinder is the edge along the gap that is followed by the cylinder body, as the cylinder rotates in the running direction. The trailing edge is followed by the cylinder gap. The leading edge of the gap is machined at an acute angle to the surface of the cylinder body, and the leading edge of the plate is bent to this angle before mounting on the press. The plate is inserted in the slot. This, plus lock-up at the trailing edge provides the gripping force necessary to pull the plate tightly and smoothly against the cylinder (see Figure 11).

The gap is, of course, a non-image area. In fact, the white space left on the web by the cylinder gap is ultimately where the web is cut off. The cut-off length of a given press is fixed in that it the plate cylinder circumference. Usually, the cut-off length of a given press is fixed in that it may be any one of a number of specific, more or less standard, sizes. When a shop places an order for a web offset press, there must be a clear idea of what kind of work will be run, as the fixed cut-off on these presses will always make some job or other impractical. (Commercial presses with variable cut-offs are now being developed; some in-line presses doing specialty work already have them.)

The gap on the plate cylinder is usually about $\frac{1}{8}$" narrower than that on the blanket cylinder. The leading edge of the plate always should rotate ahead of the leading edge of the blanket by about $\frac{1}{16}$", and the plate trailing edge should follow that of the blanket by the same amount. The reason for the wider blanket gap is that the blanket and mounting bars are much thicker than the plate and require a wider lock-up (see Figure 12).

The procedure for mounting a plate is simple but requires care. First, the plate is bent on a jig;

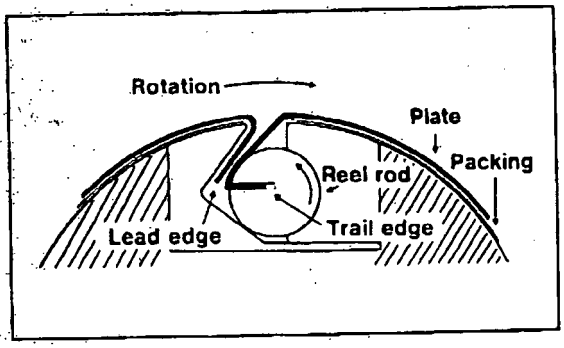


Fig. 11 Cross-section of a typical plate lock-up mechanism. The reel rod is turned with a wrench and locked into position through a ratchet-trip arrangement. As shown above, the plate is fully tightened. Note that in the drawing the plate lead edge is hooked over the cylinder nose. Actually, the lead edge is wedged against the nose by the reel rod when the plate is fully tightened.

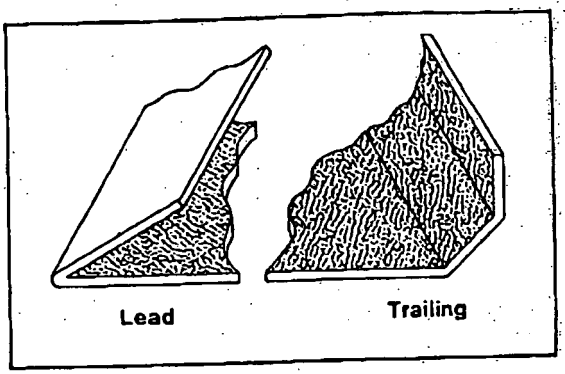
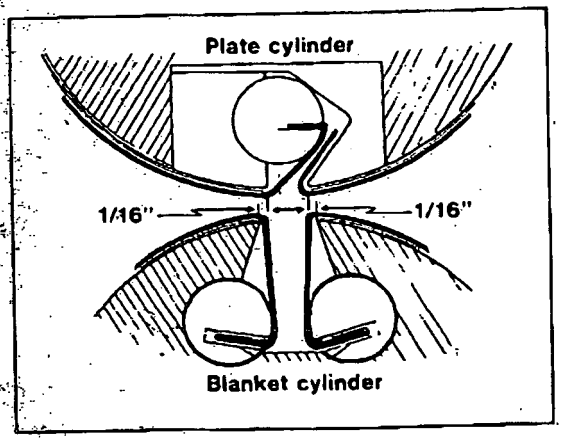


Fig. 13 Typical bends required on web offset press plates. The bends are more extreme and exacting than those required for sheet-fed presses due to the narrower cylinder gaps found on web presses.

the jig bends the leading and trailing edges of the plate so the bends will conform exactly to the lead edge and trailing edge lock-up on the plate cylinder. This operation is as simple as it sounds, but it requires great precision and care (see Figure 13). Poor bending will deform a plate so that it either will not print in register with the other plates or will not fit tightly around the cylinder. The latter condition is the principal cause of plate cracking.

Any material having enough dimensional stability and uniformity of thickness to raise a plate or blanket to proper height and *keep it there*, can be used for packing. In actual practice, few materials meet these requirements. Probably the most common material now in use is specially manufactured kraft paper. Kraft paper is a highly compacted paper that compresses very little when running. It is made in a variety of thicknesses so that the pressman, by choosing the right sheet or sheets, can create nearly any packing height on the press he may require. Kraft packing paper is manufactured to reasonably close caliper tolerances, which is extremely important to the pressman. Packing comes in treated and untreated forms. The treated form is waxed to make it more resistant to the chemicals used in lithography, but some pressmen prefer the untreated form because they believe it has less of a tendency to slip (creep) on the cylinder while the press is running.

Fig. 12 When properly timed, the plate cylinder gap falls inside the blanket cylinder gap; the blanket cylinder gap is wider by about 1/8". The cylinders are shown spread apart for easier visualization.



Kraft paper, however, does not offer the ultimate in dimensional stability on the press. Mylar, a plastic, is much tougher and is coming into wide use as a packing material. Mylar also has high resistance to lithographic chemicals. It is more expensive than kraft paper but, with reasonable care, can be used over and over again.

A word to the wise: press sheets or any other papers not designed for the purpose make bad packing materials. The thickness of the paper that the pressman prints on is not uniform enough to meet the critical standards required in press packing. It also compresses easily.

Packing is usually attached to the back of the plate. Some pressmen use tape or glue to fasten the packing to the plate at the leading edge. Other pressmen prefer oil or grease. The packing is trimmed so that it reaches to, but not past, the bends in the plate.

The plate, with the packing attached, is then inserted in the leading edge of the lock-up. The trailing edge of the plate is pulled tightly as the

:h button is pressed, turning the cylinders of the nting unit by small increments. The pressure tween plate and blanket cylinder should be "on" help roll out the plate as it goes around the linder. *The primary object is to get the plate g against the cylinder.* A bulge in the plate will x during running and can cause the plate to ick, a problem to which dirty cylinder bodies d poor plate mounting contribute. When the iling edge of the lock-up comes around, the ite is inserted and the clamps tightened. It is mmon practice to turn the plate over a few rev- itions with pressure on, checking for tightness.

The undercut on a plate cylinder is usually much less than the undercut on a blanket cylinder simply because plates are thinner than blankets. Plate thickness or gauge depends on the size of the plate: usually, the larger the plate, the thicker it is. Gauges normally vary from .012" for a 17" X 22" plate up to .025" on large plates. Some plates are as thick as .030", but the use of plates in the .025" - .030" range on web offset presses is an exception. The gauge tolerance, that is, the amount of acceptable non-uniformity in plate metal thickness, is generally no more than ±.005" for smaller sized plates.

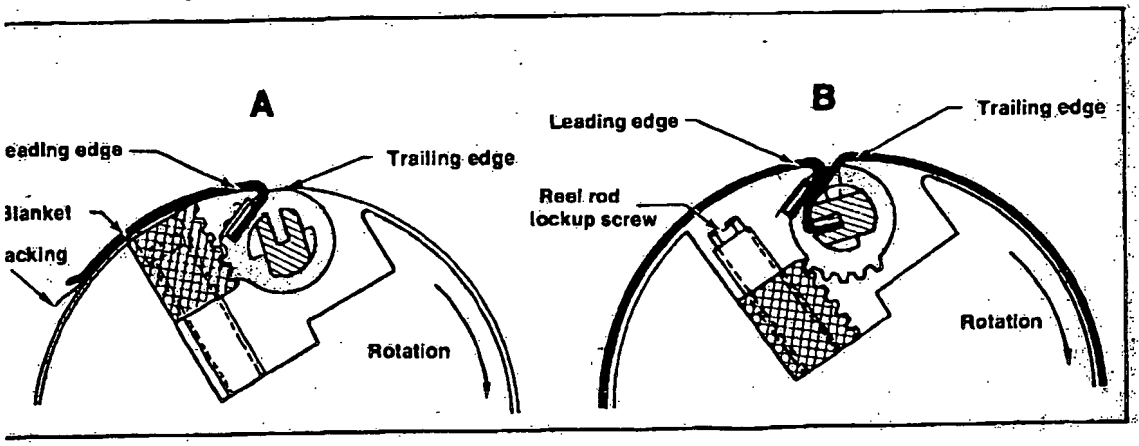
The Blanket Cylinder

ie basic design of the blanket cylinder is the me as that of the plate cylinder. Almost all anket cylinders carry bearers, a smooth ring of rd metal at each end of the cylinder. When nning, the cylinders are set so that bearers are firm continuous contact. Just to the inside of e bearers are the cylinder gutters. They help pre- nt chemicals from working in under the blanket, d keep foreign matter picked up by the bearers om moving onto the blanket surface. Between e gutters is the main part, the body, of the linder. The blanket and its packing are mounted wrap around the cylinder body.

Usually, the blanket cylinder body also has a p containing the lock-up which holds the blanket at both leading and trailing edges. The gap on the blanket cylinder is wider than that on the plate cylinder, usually by 1/8" or so, in order to accommodate the thicker blanket and the mounting bars.

As on the plate cylinder, the blanket cylinder body is lower than the surface of the bearers, and again, the difference in height is called the undercut. The amount of undercut can vary from one press to the next, and on a blanket cylinder is greater than on a plate cylinder, since blankets are thicker than plates. Blankets are usually three- or four-ply for commercial work. A four-ply blanket is used on larger presses because it has an extra layer of fabric backing for greater strength. Three-

Fig. 14 On this blanket lock-up, a rack and pinion on the lock-up screw meshes with teeth on the reel rod. As the screw turns, the reel rod turns and tightens the blanket. Note that turning the reel rod puts pressure on the leading edge of the blanket which is resting in a simple slot.



ply blankets are generally used on blanket cylinders with undercuts of .075" or less. Four-ply blankets are used on presses with undercuts of more than .075". Three-ply blankets generally are not run on cylinders with undercuts designed to accommodate a four-ply blanket. A three-ply blanket mounted on such a cylinder would require an extra .010" or so of packing. On the deeper undercut cylinders, most pressmen prefer using a four-ply blanket and less packing to avoid the problem of packing creep.

As implied in the above paragraph, blankets are packed in the same way plates are. The same packing materials are used: kraft paper and/or Mylar. However, most pressmen attach the packing to the cylinder body and then mount the blanket instead of attaching the packing to the back of the blanket.

As stated earlier, the blanket is clamped at both the leading and trailing edges, which are fitted with long metal strips called blanket bars. The lock-up grips these bars and not the blanket itself (see Figure 14). In most web offset plants, blankets are ordered with the bars already attached. The job of mounting the bars on the blanket is very tedious and slow, and most crews keep an extra set of blankets, with bars attached, ready at all times in case of a press problem.

Mounting a blanket is different from mounting a plate. Because of the elasticity of blankets, mounting tension is critical. When tightening the lock-up at the trailing edge, the pressman should take care not to pull the blanket thin at one spot or another. One factor is the strength of the pressman. Another is the blanket itself; blanket A may stretch and decrease in thickness only .001", whereas blanket B will decrease .002". These factors make it more difficult to pack a blanket properly than to pack a plate. Doing it right is something that comes only with experience, although mechanical aids are available. A torque wrench or air-operated wrench can be used to apply a known amount of tension to the mounted blanket. A torque wrench has an indicator giving an exact reading of how much torque the pressman is putting on the blanket reel as he tightens it.

Cylinder Pressures and Timing

A printing unit of the blanket-to-blanket type has two printing couples that run with their blankets in contact. Often, problems involve only one couple in the unit, and the pressman need deal only with the offending couple. Other problems involve the entire unit. In this light, the printing unit is a single, dynamic system. Changes in one part of the system affect every other part. This is most true when cylinder pressure and cylinder timing are involved.

Pressures on a printing press are not measured and stated in pounds per-square-inch, which would be desirable. Instead, such pressures are inferred by measuring the amount of interference or "squeeze" established at the printing nip. There is a reason for this. No practical means has yet been found for measuring the pressure between two cylinders on a running press. As a result, pressures are described in the most convenient measure available: thousands of an inch of "squeeze."

The principle behind the procedure that the pressman uses is simple. Assume that an unpacked plate cylinder and unpacked blanket cylinder are turning together with their bearers in firm contact with one another. There is no pressure between the cylinder bodies in this case because there is a space between them. The dimension of this space is the amount of undercut on the plate cylinder plus the amount of undercut on the blanket cylinder.

To develop squeeze in the nip, the pressman, in effect, raises the height of the cylinder bodies. He does this on the plate cylinder by laying sheets of packing and then a plate over the cylinder body. On the blanket cylinder body, he mounts a blanket and its packing. *The total thickness of the material he puts on both cylinders determines how much squeeze he will have.*

Assume that the pressman packs the cylinders so that the plate and the blanket are exactly even with the surface of their respective cylinder bearers. How much squeeze will he have? None, theoretically. The cylinders are only touching and there is no squeeze between them. If, however, he adds just one more sheet of packing .001" thick under the plate, he will have set the two cylinders to run with .001" squeeze. If he adds a similar sheet to the blanket cylinder, he will have a squeeze of .002". The effective surface of each

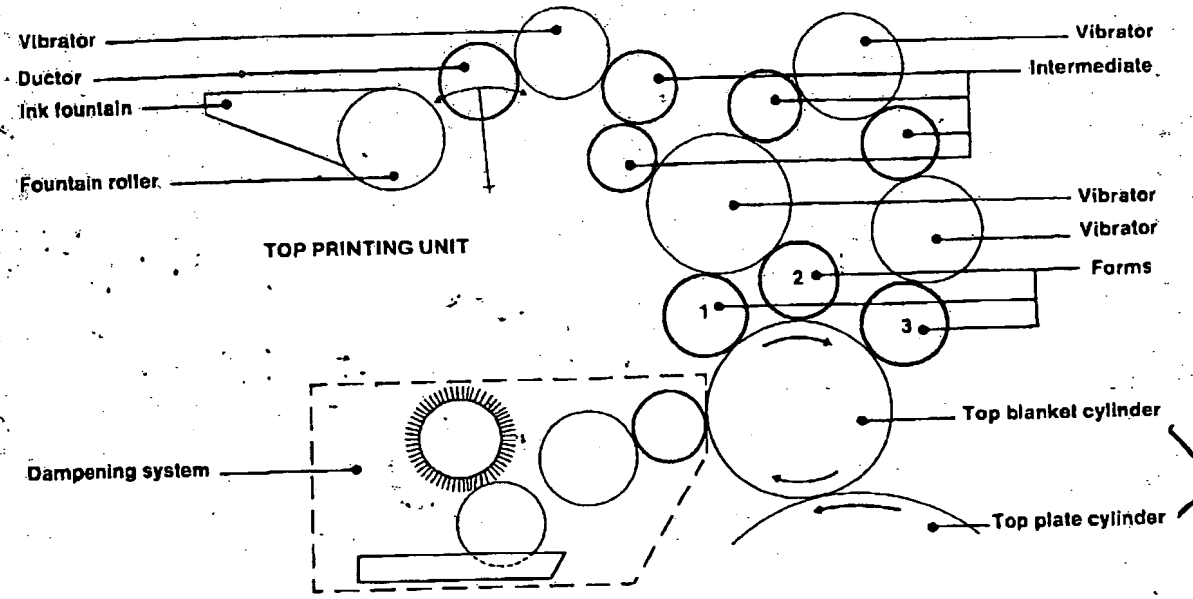
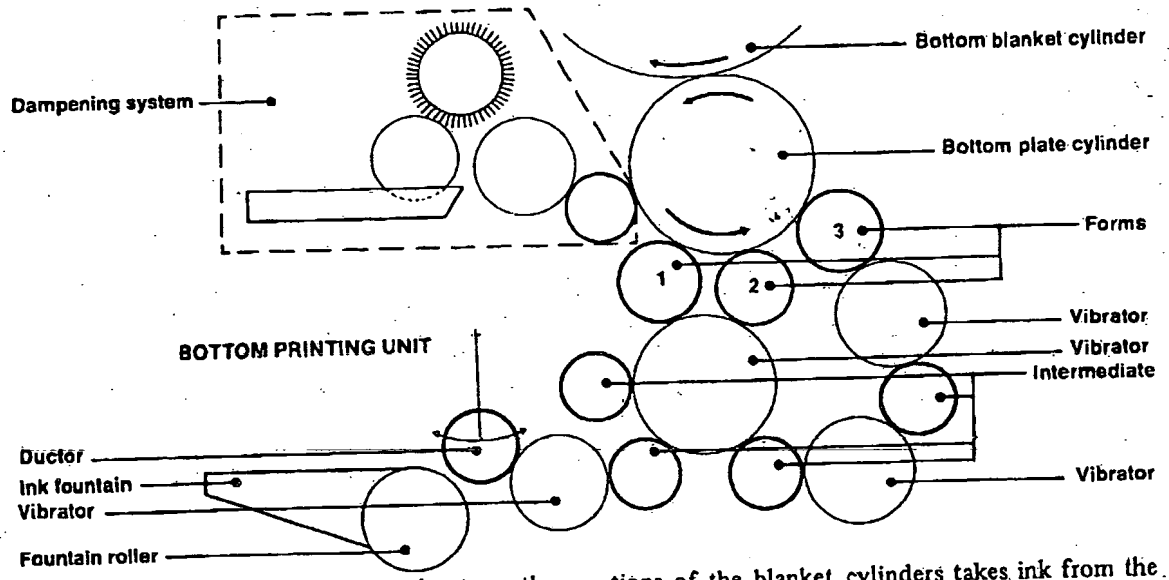


Fig. 21 A schematic drawing of the upper and lower inking systems on a typical commercial web offset press, in this case the Cottrell M-1000.



should be a narrow gap between the two, the width of which determines how thick a film of ink will be carried by the fountain roller as it rotates. Underneath the fountain blade on most presses is a row of screws called fountain keys, evenly spaced along the entire width of the blade. By adjusting the keys, the blade can be moved closer to or farther away from the fountain roller, controlling the thickness of the ink film across the roller.

A ductor roller which oscillates every few revolutions of the blanket cylinders takes ink from the fountain roller and deposits it on the first roller in the inking train. The amount of ink put on the ductor and fed into the inking train depends on two things: (a) the thickness of the ink film on the fountain roller which, as explained above, is determined by the gap between the fountain blade and fountain roller, and (b) the amount of fountain roller rotation.

The ductor roller "dwells" against the fountain

Illustrated in Fig. 27-8, each printing unit has two plate and two blanket cylinders. The paper is printed on both sides at the same time as it passes between the two blanket cylinders. The plate cylinders allow for quick plate changes. One, two, or four-page (tabloid) plates are locked into position by means of a quick set and release plate lockup. The rubber-faced blanket cylinders transfer plate images from the printing plates to the web. One blanket cylinder acts as an impression cylinder to the other, Fig. 27-9.

Each printing unit has an upper and lower ink fountain, Fig. 27-10. These ink fountains are adjustable through a series of fountain keys (25 keys typical) which allow the press operator to control ink flow across the plate. Newer web offset inking systems have *keyless fountains* which are controlled by an operator at the console.

Each ink fountain roller is driven by a separate gear motor to provide close control of inking. The inking system consists of one *ink fountain roller* that rides in the ink fountain, *one transfer roller* that conveys ink from the fountain roller to the rest of the system, three distributor rollers, one vibrator roller, and two form rollers.

Each printing unit also has an upper and lower *water system,* Fig. 27-10. This system applies the proper amount of dampener solution to the non-image areas of the plate surface. The dampener solution repels ink, thus enabling the non-image areas to run clear.

The *water fountain roller* is driven by a motor. It collects dampener solution on its surface as it rotates. As it turns, the fountain roller carries the solution to the cloth-covered transfer roller, which is driven by the vibrator roller. The solution is then transferred from

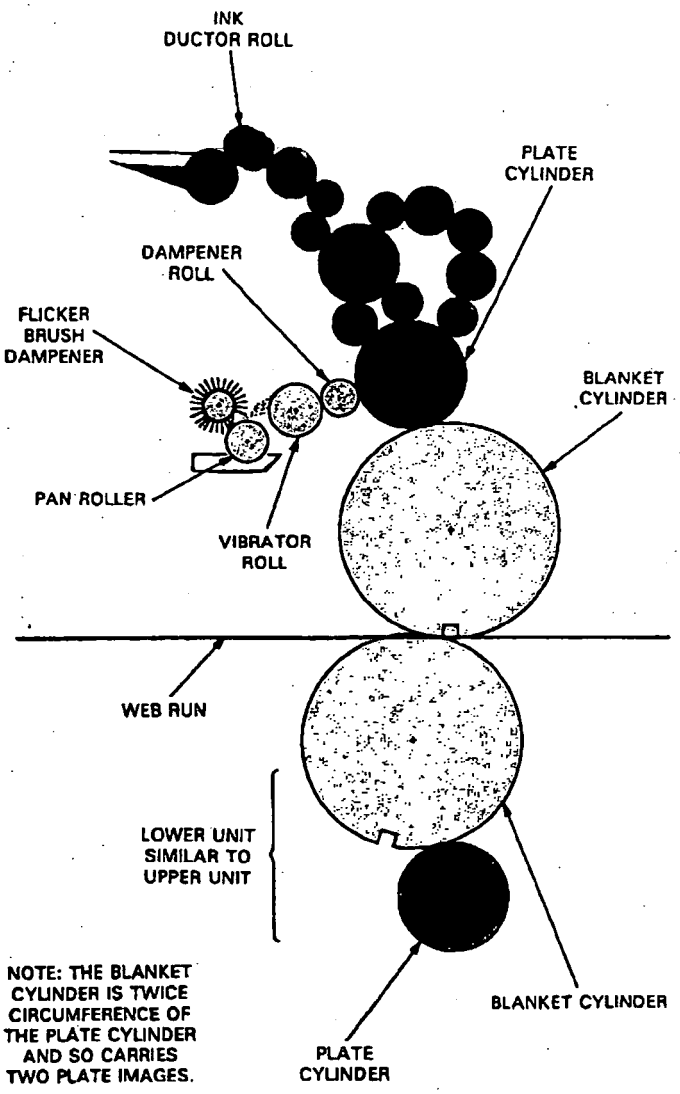


Fig. 27-8. This schematic diagram illustrates how the perfecting blanket-to-blanket web-fed offset press operates. The blanket cylinder is twice the circumference of the plate cylinder and thereby carries two plate images.
(Harris-Cottrell Company, Division of Harris Intertype Corp.)

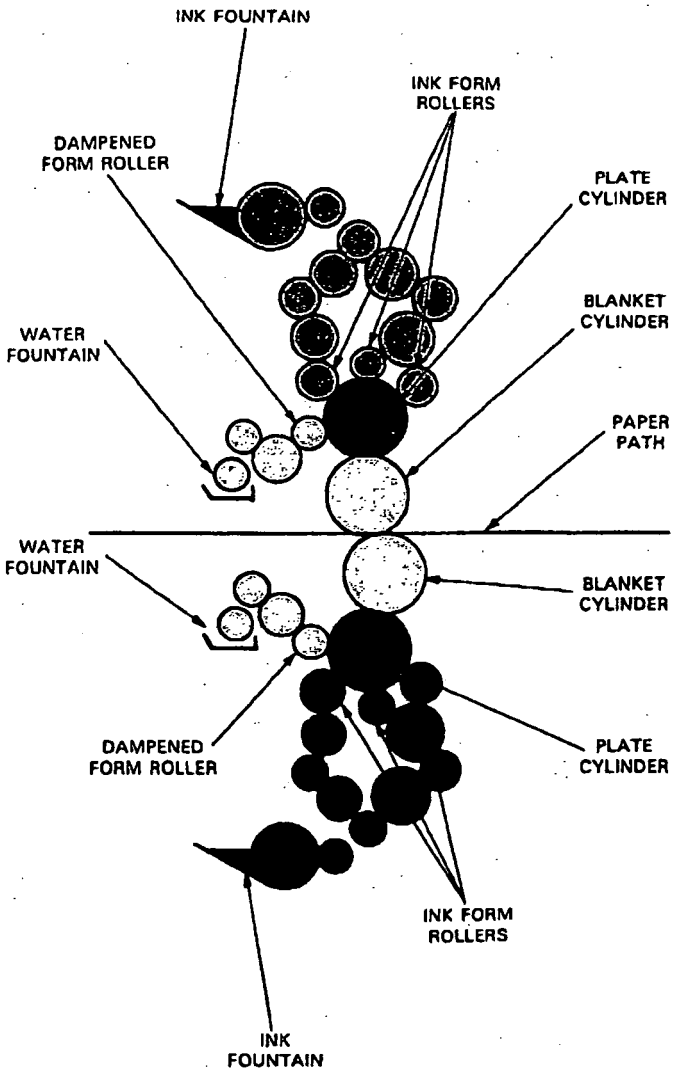
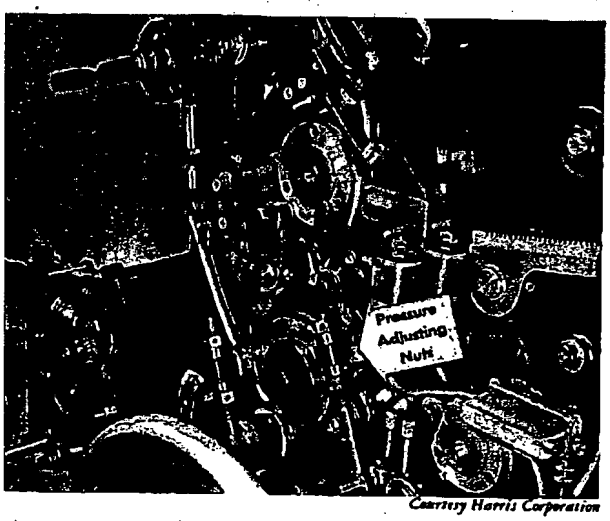


Fig. 27-9.This schematic diagram illustrates the principle of how the rubber-faced blanket cylinders on a perfecting blanket-to-blanket offset press transfer plate images from the printing plates to the web of paper.
(Rockwell International, Goss Division, MGD Graphics Systems)



sure adjustments on blanket cylinder. The adjustment to
f cylinder mounting is for alignment between blanket and impression cylinder.

e terms "compressible" and "noncompressible" are iptive of how the blanket behaves under the squeezing n of the printing nips—plate/blanket nip and blanket/sub- nip. The noncompressible, or conventional, blanket when zed in the nip bulges out on either one or both sides of the This bulging is due to the fact that the materials from which ventional blanket is made cannot be compressed; rather, are displaced. This displacement is illustrated in the sketch action in the nip. Excessive plate/blanket squeeze causes a ng action against the plate as the blanket tries to recover its al shape. This rubbing action will result in a shortened life. In the blanket/substrate nip, excessive squeeze will in a slurred print. It should not be assumed from this that oncompressible blanket should never be used; there are where a *controlled* amount of slur will produce a print more ctory to one that is not slurred.

materials used in the construction of a compressible et will compress in the printing nips. This design makes it le to take advantage of greater squeeze pressures (within) that, in turn, usually result in improved ink transfer.

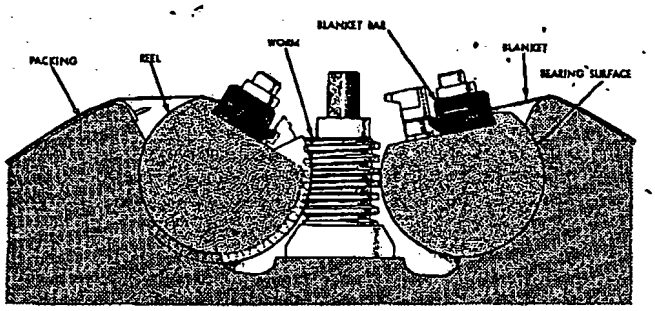
lecting the Blanket. Different types of blankets are ble. For example, some work better with coated papers. ally formulated blankets must be used with some inks; t inks are one example. As has already been stated, lly formulated blankets are available in either compressi- noncompressible construction; it is the material (usually r) in the face of the blanket that is formulated to meet l requirements. Therefore, we have two responsibilities ning the blanket itself: (1) We must select the blanket best to the paper and ink being run; and (2) We must handle it rly. It should not be inferred that this is time-consuming tly. One doesn't change the blanket for every change of . In actual practice, a plant that only occasionally runs a paper job will do well to have a special blanket available at purpose. As we previously stated, some of the newer ink lations require special blankets. Which blanket is best for these should be determined by discussing the problem with the suppliers.

Checking a New Blanket. When a new blanket is received, it should be checked immediately for proper size, with the warp line or directional arrows (on the back of the blanket) in the around-the-cylinder dimension. Then, it should be checked for squareness of the across-the-cylinder edges with the warp lines. Next, it should be checked for any obvious defect on either side, and finally, for correct caliper. The best blanket thickness for a particular press is the thickness recommended by the press manufacturer. Checking caliper is best done with a blanket thickness gauge. In the first place, gauges are so designed as to indicate the caliper that the blanket will have after stretching around the cylinder. In the second place, measurements can be taken over the entire surface of the blanket. Thereby, it is possible to arrive at an average figure for calculating the proper amount of packing. The conventional machinists micrometer is not a reliable instrument for accurately determining the caliper of a resilient material such as the blankets used on the lithographic press.

Preparing the Blanket for Mounting. Most presses require that blankets be mounted in blanket bars for use on the press. Some presses are so designed that the blanket, once it is cut properly for size and squareness, is mounted directly into blanket clamps built into the blanket reels.

Blankets that are prepunched to match specific blanket mounting bars are available from the blanket manufacturers. The bars are mounted by the press crews. Premounted blankets are also available.

Unless otherwise specified, the holes in a prepunched blanket will fall on a straight line across both ends of the blanket, at a right angle to the directional arrow (around-the-cylinder direction) stamped on the back of the blanket. The two rows of holes are parallel to each other. There is some question on this last point. On larger presses (over 35 in.) when a "normally" punched blanket is tightened on the cylinder, there may be greater pull on the outer edges of the blanket than in the center; the larger the press, the greater is the difference in achieved tightness. This uneven tension is counteracted by having the holes punched along an "offset" line at both ends. This line is illustrated in the accompanying sketch. Experience has demonstrated that on presses 40-in. or less in size, the offset should be 1/8 in.; on 45-in. to 63-in. presses, the offset should be 3/16 in.; on larger presses, the offset should be 1/4 in.



Blanket reel tightener and support.